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GENERAL ASPECTS OF THE TREATMENT OF CHRONIC ARTHRITIS*

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INTRODUCTION

THE general principles of the treatment of chronic arthritis are to improve all functions of the body, to modify or remove the basic causes and to prevent or control organic changes; to make adjustments that will lessen the burden of the handicapped organism. The two main types of chronic arthritis† are generalized diseases with joint manifestations, and thus the treatment must be directed first toward the patient as a whole and only secondarily toward the joints themselves. Before adequate treatment can be undertaken a complete diagnosis must be obtained; one that includes recognition of all the altered functions of the body based upon sound physiological grounds. There must be full comprehension of every detail of the patient's life. His mental attitude toward affairs of life must be understood or else the physician cannot prescribe wisely the most suitable régime for the given patient. The physician must be well acquainted with the symptomatology of chronic arthritis and recognize that these patients are subject to relapses as well as remissions of their disease. He should realize, as pointed out by Vigoureux in 1893, that the patients often have symptoms called neurasthenic; that irritability, depression, exhaustion, vasomotor symptoms and those of neuromuscular hypertension are common.

Success in treatment depends on well-coördinated lines of therapy carried out for an indefinite period of time with attention to infinite detail. The physician must have a deep interest in his patient, and be willing to listen and evaluate long stories of woe and symptoms. He must take infinite pains to delve deep into the patient's life, obtain knowledge, and apply it; knowledge of the sort required to help individuals with functional disorders of the nervous system which indeed many patients with arthritis have. One must prescribe with originality from information gained concerning the balance inside and outside the individual and from a study of how his "human machine is used". Perseverance, determination, patience, optimism, attention to detail, and never casualness, on the part of the physician and patient are essential. Patience, persistence, and fidelity are fundamental but not creative qualities; one must possess and practice them, but one must go far beyond if he is to obtain success and put himself into his work for the individual with arthritis. The physician must inspire and must make free use of the imagination in as real and true a sense as the great poet or artist. The imagination is not a decorator and embellisher, it is a creator and constructor; and for each case of arthritis often many adjustments and arrangements must be made suitable in detail for only that patient. It is the play of the imagination that permits rearrangements so necessary from time to time for the chronic invalid. Physicians probably rather often do not recognize that failure in the treatment of arthritis may be due to the lack of imagination on their part. The patient must appreciate that he requires a long period of training; and like the physician must have no doubts of the fact that wisely conducted treatment leads to success in a large proportion of cases.

Cornaro, in the sixteenth century, set the good example that an essential principle in the prevention and treatment of chronic disease is to practice the art of living. This cannot be taught by standard directions regarding each phase of life. Each case occurs in a person with an individuality of his own and he must be instructed in the art of living best for himself based upon acquaintance with physiologic mechanisms and upon a knowledge of how they are influenced by rest, exercise and food. We are, as Arnold Bennett says, all amateurs in the art of living, that art which lies particularly in keeping the peace with those with whom one is thrown or with one's mental and physical environment. Curiously enough only an inappreciable fraction of our efforts are given to the business of actual living, as distinguished from the preliminaries of living such as educa-

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†The two main types of chronic non-specific arthritis are
(1) Atrophic, synonymous with proliferative and rheumatoid arthritis.
(2) Hypertrophic, synonymous with degenerative and osteo arthritis.

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tion, obtaining shelter, food, and other supplies for our dependents and ourselves. Education of the individual with arthritis to meet the problem of chronic disease is fundamental.

REST

Rest is of the utmost importance in treatment, just as it is in tuberculosis and other chronic diseases and it is, indeed, for many disorders, perhaps the most potent single therapeutic procedure at our command. In the development of the modern treatment of tuberculosis fresh air and food headed the list at first, but now it is well known that rest is of prime importance. A similar state of affairs is taking place in regard to the treatment of arthritis; but as yet the fundamental importance of rest for patients with early, as well as the late, stages of arthritis is none too well recognized. Rest, however, does not mean necessarily going to bed. In bed the patient may be restless, fidgety and worried by an overactive and anxious mind, and maintain tense muscles. Rest in bed improperly carried out may nullify its purpose. One must prevent persistent recurring reflexes and voluntary activities which interfere with complete rest and tend to maintain disordered states. The goal to be obtained is habitual relaxation and tranquillity, but at first one must establish this state and place in "the reserve bank" an accumulation of the forces obtained by rest and relaxation. Relaxation does not mean diversion. What Edmund Jacobson has to say in his book entitled Progressive Relaxation (University of Chicago Press [1928]), is worthy of attention in the treatment of the arthritic patient. To relax is to unbend the bow to diminish the tension. Relaxation involves passivity, a negative condition so far as activity is concerned although definitely a positive condition so far as progress is concerned; a point the patient should grasp.

Rest means different things to different persons; to some sloth, to others relief that follows change of occupation. It is often a relative state of consciousness and different constitutions and temperaments will react differently. It is relief from strain of all types that must be secured; a difficult duty that means adjusting life to what often appear to be antagonistic tendencies. The repose which comes from adjustment to present conditions, acceptance of present limitations and a victorious recognition of the future is within reach of everyone who strives for it, but it must be won to secure results in the struggle for cure. This repose is to be found not so much in conditions as in the inner recesses of the heart and character of the patient and the physician. The patient must learn to never become tired and, if fatigued at all, to rest until completely refreshed. The one who does not do this invites disaster and progress of his disease.

An understanding of the physiology of fatigue and the ways in which it lowers resistance and deflects efficient function, with appreciation of how to prescribe rest by art and science, is of fundamental value. It becomes evident in advanced cases of chronic arthritis that rest is desirable but complete relaxation and cessation of strain are even more valuable in that type of case where the middle-aged woman says, "yes, the fingers of my hands are stiff and a little swollen, especially in the morning and there is, I suppose, nothing that can be done about it." It is more valuable because rest, in the complete sense, with correct living, can alone prevent advancing disease. There would be vastly fewer crippled persons with arthritis if all the milder and ambulatory cases were treated at once with an intense program of rest. In many instances this program should start with a period of rest in bed, usually for a longer time than one is apt to think desirable. In doing this it must be remembered that at first many persons feel less well and claim they are more tired than when "on the go". Such symptoms only indicate that relaxation has commenced and show up the patient's actual condition of fatigue formerly hidden by the tension of his life.

The importance, at times, of rest locally to joints is obvious and not for discussion here, but it may be noted that one accomplishes this sometimes while obtaining general relaxation in bed.

EXERCISE

Exercise of the correct amount, and at suitable times, is also an important prescription for the patient with arthritis. It influences favorably, of course, the capillary and general circulation and all bodily functions. The presence of retarded capillary circulation in arthritis must be kept in mind and various measures employed to enhance function. There are four types of exercise for consideration in each case.

(1) General exercise of the body for which walking is excellent.

(2) Passive exercise as massage at times for its systemic effects and at times for local effects, but at no time should it be given so as to fatigue the patient.

(3) Postural exercises to improve bodily mechanics and to aid in rehabilitating the structurally inferior.

(4) Special exercises for the retraining of muscles and to aid in the prevention of strain upon joints.

The value of other physiotherapeutic measures for the patient and for his joints must not be forgotten and concern detailed rather more than the general aspects of treatment. However, appropriate rest, exercise and local treatment for the diseased joints are important and

include measures to favor function, to stimulate circulation, to increase comfort and to prevent and correct deformity. Heat applied in various ways can often give relief particularly because of its vasodilatory effect. The treatment of the joints varies, of course, with the type of arthritis and the precise condition in the given case.

The patient with arthritis who is put to bed or kept physically quiet must not be allowed to remain wholly inactive for an indefinite period because muscles which are not used tend to become flabby and atrophied and the capillary circulation, often already impaired, tends to become less active when motion ceases. Properly given massage and active and passive exercises aid in avoiding these undesirable features and may indeed contribute importantly to therapy. These are necessary adjuncts of treatment but may be futile as to recovery unless the generalized nature of the disease is recognized and its basic causes are combated.

The patients who lie back and worry, and who rely on drugs and do not exercise, do badly. One must prescribe the amount of exercise suitable for the individual patient making changes according to circumstances as carefully as for rules regarding the avoidance of fatigue and for leading a well-planned life.

DIET

In order to improve all functions of the body the diet must be considered and prescribed carefully. Almost every individual with arthritis will wish to know what he is to eat, and the physician should always order the diet for each patient. There exist many peculiar fads concerning diets for arthritics and these patients will often have fanciful ideas regarding what they can and cannot eat. Frequently it will be necessary to expound fundamental facts about nutrition in order to convince the patient of the wisdom of the prescribed diet. There is, of course, no standard diet for arthritis. The physician must comprehend the principles of optimal nutrition and not be satisfied with apparently satisfactory nutrition. He must select the food for the best possible state of health taking into account every aspect of the patient and his case. The caloric intake must not be more than just sufficient for the given case. The frequency with which chronic invalids select food unwisely must be remembered and that border-line states of nutritional instability or partial dietary deficiencies are common. It takes a long time, in the normal individual, for the effects of a persistently slightly faulty diet to become detectable with ease, but they appear much more readily when adverse factors exist, such as infectious processes, arteriosclerosis and chronic fatigue. The inhibitory effect on nutrition of various conditions common in arthritis only emphasizes the importance of no departure from the optimum in the composition of the diet and suggests that at times it may be desirable for the patients to take unusual amounts of certain dietary factors.

The diet must be prescribed not only to establish optimal nutrition but to meet various conditions, one of which is the state of the gastro-intestinal tract. It should be realized that chronic disordered digestive function often precedes the onset of arthritis and probably plays some rôle in its causation, and that impairment of digestive function or increase of digestive disorders already present may arise as the result of arthritis. The undesirable effects arising from long-continued daily or frequent use of cathartic drugs leading to the absence of formed stools are to be recognized and corrected. The frequency of gastric and colonic atony, intestinal stasis, achlorhydria, carbohydrate indigestion and the like in arthritis is to be recalled; and indeed gastro-intestinal disorders in arthritis can illustrate most of the known so-called functional disorders of secretion, motility and absorption of the gastro-intestinal tract. It is often serviceable to lessen the load upon the gastro-intestinal tract since it is prone to acquire dysfunction, and one must attempt to establish normal intestinal function. The physical state of the food must be considered, and often it will be found that the type of soft diet recommended by Alvarez will be valuable. An exposition regarding its use and regarding functional disorders of the gastro-intestinal tract is described splendidly by Walter C. Alvarez in his book on "Nervous Indigestion". (Paul B. Hoeber, Inc., N. Y. 1930.) This book is of value for the physician caring for patients with arthritis and he also should be acquainted with Burnett's work on anabolic nutrition and intestinal function. (See this *Journal* 205:251, 1931 and references there.) Little is known concerning the difficulties of absorption and utilization of food products from the digestive tract and regarding what particular food factors may improve gastro-intestinal function. The future should enlighten us on these subjects, but it is probable that significant degrees of such disturbances may arise in arthritis and be overcome by well-chosen diets and perhaps by an unusual abundance of certain food factors, or even possibly by their parenteral administration. Diets rich in carbohydrate and sparing in protein and in vitamins, especially B, have produced in animals dilatation, stasis, and atony of the bowel comparable to what is often seen in clinical arthritis, and the animals have also developed arthritis. (McCarrison.) A similar state of the gastro-intestinal tract has been seen in man when the diet for a long time has been of this type whether arthritis was present or not. The intestinal condition also occurs in arthritic and other patients when there

has been no distinctive chronic dietary deficiency. Under these various circumstances upon institution of a proper diet with concentrates of vitamin B, and often other vitamin concentrates, the bowel condition frequently returns toward or to normal as the animal's or patient's health improves. (Fletcher.) There is also evidence that reduction of carbohydrate, caloric intake and bulk of food can improve such a disorder of the bowel. (Pemberton.) There is, however, much to be learned before the administration of vitamin concentrates for many purposes can be put on a sound physiological basis. Their administration to certain cases of arthritis may, however, be employed with probably some advantage for various empirical, theoretical and scientific reasons besides those concerning effects on digestive function; for example, the feeding of calcium and viosterol when there is evidence of bone atrophy and deficiency of calcium in the diet. Let this be as it may, the patient with arthritis often can be benefited by improving intestinal absorption and function, especially by diet.

One must also prescribe the diet only after due consideration of other factors. The whims of the patient must be catered to. The body weight and food allergy require recognition. Weight reduction alone may play a distinct rôle in improving the obese patient with hypertrophic arthritis. Improvement in nutrition resulting from an optimal diet, with occasionally large amounts of particular diet factors, such as iron or vitamin B, may accomplish much for the patient with arthritis.

Occasionally temporary undernutrition may permit the activity of an arthritis to subside and sharp curtailment of the caloric intake in suitably selected cases—never when fever or complications such as anemia exist—for a limited period of time can be of distinct value. Although there is no standard diet for arthritis, there is evidence that sometimes the patients do particularly well by remaining on a diet which curtails the carbohydrate, especially the concentrated starch foods and sweets. This diet should contain only enough—not more—calories to meet the body's demands, generous amounts of foods rich in vitamins and minerals supplied in proper proportions and adequate protein of good biological value. Although this sort of diet may favorably affect certain metabolic aspects of some arthritic patients and the nutrition of their joints, it should not be forgotten that such a diet can benefit the patient in numerous other ways, such as by decreasing intestinal carbohydrate indigestion.

It is difficult to determine which cases are best suited to a pronounced reduction of carbohydrate but stool examination for signs of carbohydrate indigestion, clinical experience and trial can point the way. Pronounced curtailment of carbohydrate, however, is not for indiscriminate use in arthritis. In any event the basic principles of nutrition must be adhered to and a diet for arthritis must not be at the expense of the patient, or permit permanent undernutrition in any sense of that word. The diet should be well balanced, the quantity of the food should not be excessive and the nutritive quality should be superior.

CERTAIN ENVIRONMENTAL ASPECTS

In addition to rest, exercise and diet, there are other simple matters concerning the patient's daily life for the physician to consider.

A study of the sociological, environmental and hygienic aspects of the case will often point the way to improvement of the patient. There are to be considered the harmful effects of bad housing conditions, barometric fluctuations, dampness, improper clothing and bathing, all of which may unfavorably affect the already altered tone of the arthritic patient's sympathetic nervous system, leading to further maladjustment of the capillary circulation and heat regulation. The beneficial effects of an equitable and dry climate, proper functioning of the skin and body heat regulatory mechanism are to be recalled. The influence of emotional episodes in producing muscle soreness and altering sympathetic nervous system tone only emphasize further the importance of measures directed toward arranging matters so that all functions of the body, not forgetting those of the mind, are performed as effectively as possible.

THE REMOVAL OR ALLEVIATION OF INFECTION

The general principle of the removal of predisposing and exciting causes has been alluded to. Some of these factors, especially fatigue, inferior body habitus, inadequate exercise and disordered nutrition and digestion have been mentioned. It is obviously desirable for the patient to avoid physical trauma which, when repeated chronically is a potent exciting cause of arthritis, most strikingly so of the hypertrophic type. The removal or alleviation of infection is of distinct importance, but consideration of foci of infection must not be eliminated from haphazard advice.

There have been many unnecessary and unwise removals of so-called foci of infection. To eradicate them and to do nothing else is comparable to bailing a boat and leaving the bunghole open. Many teeth have been removed unnecessarily and exhausting operations for removal of foci of debatable significance have been performed, especially in hypertrophic cases, with great disappointment to the patient and physician. A distinction must be made between cases where there is a clear-cut relation between infection, such as an attack of tonsillitis and the development of joint symptoms

and cases where infection exists, such as chronically infected tonsils, without historical evidence of relation to joint manifestations. It is also important to appreciate that infection probably plays a much more important rôle in atrophic than in hypertrophic arthritis so that when in doubt about removal of a suspected focus the type of case may influence the decision. Many cases, however, of the atrophic type have improved while carrying low-grade foci of infection and the infectious condition may improve as the arthritis lessens and the patient gains in health by rest, exercise and diet. Infections can accelerate degenerative processes and thus can aggravate hypertrophic arthritis. It should be borne in mind that in a given case both a focus of infection and the arthritis may have a common basis and that the patient with atrophic arthritis is prone to acquire infections, so that an infectious condition often develops in these individuals after the onset of the arthritis. It is most obvious that infections of considerable degree or sufficient to cause fever readily aggravate and inhibit the improvement of many conditions of which arthritis is one; they can lead to depression of repair functions as shown readily by a decreased response in their presence to replacement therapy for deficient states such as vitamin deficiencies, certain anemias and diabetes mellitus.

Removal of foci of infection should be carried out as early in the course of the disease as possible, as it is at that time that the best results from their eradication are obtained. If an infectious process has persisted several years its removal will seldom influence the arthritis. Before surgical procedures the patient should be built up in health as much as possible. The severity of operation for removal of infection and the degree of infection are to be evaluated. Mild procedures, such as prostatic massage, may be tried when in doubt, but radical operations as upon the nasal accessory sinuses or gall bladder should rarely be undertaken unless there is very definite evidence of active local disease. When chronic focal infection such as about the apex of a tooth or elsewhere in the body is in itself of such a nature that removal is necessary it should be eradicated. This, however, should be done more often without the expectation that it will cause great change in the arthritis than that it will do so.

TREATMENT OF COMPLICATIONS, THE USE OF DRUGS AND VACCINES

The remaining principles of treatment which have not been mentioned will only be alluded to and concern:—

(1) The treatment of complications or attendant disorders, having in mind that the more the patient's health and circulatory tone is improved, the better he will become.

(2) Alleviation by the use of drugs, vaccines and the like.

Hypochromic anemia is common in the atrophic type but large doses of iron will not correct it when infection is prominent or the disease distinctly active, for these conditions inhibit the effectiveness of iron in the formation of blood.

Disorders of the glands of internal secretion are to be sought for and the effects of lowered basal metabolism considered. The cautious use of thyroid extract can be helpful in some cases, especially of the hypertrophic type, and even when myxedema is not suggested. Ovarian medication can aid an occasional case of arthritis, especially some of those commencing in association with the menopause.

Arsenic, especially in the form of Fowler's solution, has been used in arthritis since John Jenkinson of Oxford first employed it in this condition in the early part of the nineteenth century. It can affect the interchange of tissue fluids and thus may perhaps improve the nutrition of the joints. It is a medicine that affects the body in various ways and at present may be considered, among various others, as a "tonic" for these patients.

The salicylates in a variety of forms may alleviate pain and possibly sometimes affect the patient favorably in some other manner.

Vaccines and non-specific protein therapy are not to be considered in hypertrophic arthritis, and for the atrophic case, their value is debated. Intravenous injections are dangerous, but non-specific protein shock therapy by other parenteral routes can have beneficial effects. Certain cases do show improvement under streptococcal vaccine therapy, but usually other measures are pursued at the same time. Much is to be learned. Too much vaccine and too many reactions can do more harm than good. Too often vaccines have been given because it was not known what else to do.

THE RESULTS OF TREATMENT

What can be expected if the general principles of treatment are carried out faithfully? In the first place, the physician must not pride himself that he, or even the patient, is responsible for all improvements because nature tends to heal; cases do "spontaneously" cease to progress. Of course, one cannot expect the moderately advanced or severe cases with considerably damaged joints to attain normal joints. Articular cartilage cannot regenerate completely; synovial membrane can do so, and bone can repair to some extent. One can expect the disease to be arrested and the patient to be much better.

As long ago as 1795 Thomas Fowler recognized that patients with "chronic rheumatism" could often be "cured or much relieved,"—62

per cent of his 288 cases. He did not give his "mineral solution" to these patients but treated them with warm baths, induction of sweating and apparently by establishing a well-ordered life. He noted that the chances for improvement were greater in the younger patients, which also seems to be true today. His cases probably represent a variety of conditions and his report is of historical interest as one to point the way. Under conditions of control in Sweden it has been shown recently that of the many cases in hospitals for arthritis, including many well-advanced and some absolutely disabled cases, that 60 per cent were back at their old jobs with comfort three years after they left the hospital. From London, Neligan reports for many hundred cases of the Red Cross Society City Clinic a similar result for 70 per cent of the males and 80 per cent of females.

Fifty patients with definite symptoms and signs of arthritis, from the atrophic type in 25 and hypertrophic type in an equal number, whom I first saw in private practice prior to four years ago, have followed advice faithfully under the guidance of various physicians. Few have had foci of infection removed since I first saw them. These cases are about equally divided between what may be termed relatively mild and moderately severe cases; none were far advanced cases, and distinctly mild cases are not included. About 85 per cent of the patients are very definitely better and at least 60 per cent appear to have had their disease arrested for two years or more. Fourteen (8 atrophic, 6 hypertrophic) of the 50 patients consider that their joints have not bothered them at all for over five years. In contrast, of 50 other similar cases and patients who did not follow advice faithfully, but sometimes in an irregular manner, there are about 35 per cent, in contrast to 85 per cent, who seem to be definitely better and two (atrophic) in contrast to 14, who consider that their joints have not bothered them at all in the past three years.

CONCLUDING REMARKS

Prevention of disease is our main object and early cases of arthritis must be treated intensively and wholeheartedly. To do so, an appreciation of the mild early symptoms is important; transient recurrent attacks of vague muscle pains, stiffness of the neck and joints, various vasomotor symptoms, exhaustion, lack of sense of well-being, and so forth. Often there are long intervals between the symptomatic attacks of joint pain. It must be recognized that physical excess and fatigue, as shown by various published data, are more often responsible for relapse than anything else. It is difficult to persuade "rheumatic" individuals who feel pretty well—and there are many of them—to follow out the simple procedures, such as rest programs, which are wise for them. But it is the simple things, in the light of our present knowledge, that are the most important to prevent the progress and cause arrestment of arthritis, as is the case for tuberculosis. Time in chronic arthritis is everything. Intensive treatment early offers the patient a vastly better prognosis than if it is delayed until the disease has existed a few years. Enough time for adequate treatment is fundamental.

The condition touches many fields of medicine and skillful coördination of various forms of therapy is often necessary with coöperation of physicians trained in different ways. However, one man must be the patient's chief and take full charge of him and his case. The physician and patient must reciprocally coöperate and appreciate that the desirable effects of treatment for arthritis may be detected only after many months and that for considerable improvement in health it may require several years. Both must realize that certain rules will have to be followed indefinitely or else relapse is invited, that much can be done for the individual with arthritis and much crippling prevented.

The patient's body and mind must be kept in tune, and predisposing and exciting causes prevented and removed. The physician must utilize and promote science and be an artist, one who can deal with human affairs and who has a creative imagination.

To teach the art of courageous living is often the chief prescription for the patient with chronic arthritis.

MORTALITY RATES

Telegraphic returns from 85 cities with a total population of thirty-seven million for the week ending May 27, indicate a mortality rate of 10.8 as against a rate of 11.2 for the corresponding week of last year. The highest rate (17.1) appears for San Antonio, Texas, and Wilmington, Del., and the lowest (3.6) for Yonkers, N. Y. The highest infant mortality rate (12.9) appears for Atlanta, Ga., and the lowest for Bridgeport, Conn., Duluth, Minn., Fall River, Mass., Schenectady, N. Y., South Bend, Ind., Tacoma, Wash., and Yonkers, N. Y., which reported no infant mortality.

The annual rate for 85 cities is 11.8 for the twenty-one weeks of 1933, as against a rate of 12.3 for the corresponding period of the previous year.—*Bureau of the Census.*

NEW ENGLAND SURGICAL SOCIETY

INTRAHEPATIC CHOLELITHIASIS*

BY M. F. FALLON, M.D.†

FOR a proper understanding of our subject, perhaps a brief reference to the anatomy of the liver and bile ducts will be appropriate. The intrahepatic bile ducts begin within the hepatic lobules of the liver between the liver cells; outside the lobules they are joined by other ducts forming the interlobular ducts. They tunnel through the liver and all converge to form the right and left hepatic ducts and these in turn unite after leaving the liver to form the common hepatic duct. The ducts within the liver bear an intimate relation to the blood vessels; every branch of the portal vein is accompanied by a corresponding branch of the ducts and the veins and the ducts and a branch of the hepatic artery together with branches of the hepatic nerves and lymphatics all surrounded by a prolongation of Glisson's capsule course throughout the liver to their exit.

This paper has to do with the occurrence of gallstones in the ducts within the liver and although a rarity, these stones are present often enough to demand the attention of any surgeon operating on the biliary tract.

FREQUENCY OF SUCH STONES: Schroeder, who based his statistics upon autopsies of all ages done by von Recklinghausen during the years 1880-1887, found that ten per cent had gallstones and, that nine per cent of these had stones within the intrahepatic ducts. Naunyn[1], commenting on these statistics said, "But they are actually much more common than this (nine per cent) for such biliary gravel is often present in the ducts in the liver in cases in which no actual gallstones are present. These tiny formations may lie singly in the bile by which they are easily washed away or may be collected into masses in one or many of the intrahepatic ducts so as to fill them. . . . Cruveilhier, Frerichs, Courvoisier and others have recorded cases in which the entire system of bile ducts from the papilla Vateri to the smallest intrahepatic branches were found completely packed with stones of various sizes." The statistics of Schroeder who found intrahepatic concretions in nine per cent of autopsied cases with gallstones are deserving of credence since his work was endorsed by such eminent authorities as Naunyn and von Recklinghausen.

Beer[2] reports from a study of autopsies "In a total of seventy-two cholelithiasis cases 8.3 per cent showed intrahepatic stone-formation." Some other pathologists have not found such a large percentage of stones in the intrahepatic ducts. Previous to thirty years ago most of our knowledge of this lesion came from the pathologists and the older literature had more references to intrahepatic cholelithiasis than the modern. The explanation of this, possibly, is that the severe infections, such as typhoid fever, prerequisites to the formation of these stones are now so infrequent. I know of no disease on which the reports and literature are so conflicting and confusing to the reader as that of liver gallstones. Hence, it is refreshing to have a definite report on this subject such as that by K. H. Digby, Professor of Surgery, in the University of Hongkong, to whom an unusual opportunity has been given to operate on patients with stones in the liver. He says[3], "Disease among the Chinese follows much the same lines as disease amongst Europeans but there are a number of striking differences. . . . When we find a stone in the common bile duct in a European or an American woman it is nearly always of small or moderate size and we are sure that it originated in the gall-bladder. . . . In Chinese patients as seen in Hongkong we find an entirely different picture, stones in the common duct usually originate in the liver. . . . Conversely intrahepatic stone-formation occurs as a rarity amongst Europeans. The frequency of its occurrence amongst Chinese in Hongkong facilitates the study of the condition and may perhaps enable some light to be thrown on the relatively uncommon cases in Europe. . . . In all these cases (operated) there was great enlargement of the common bile and common hepatic duets up to a diameter of one inch. In every case the gallbladder was much distended and the liver was enlarged. In the post-mortem cases the intrahepatic ducts showed dilatation when the liver was cut across" and as to the cause of these stones he says "some clinical food poison might conceivably lead to inspissation of the bile and stone-formation but a more probable view is that acute cholangitis due to some bacterial infection originates the disease. The rigors and fever certainly show that acute cholangitis was present in our patients when they came under observation. . . . If left alone these cases probably all die from the condition sooner or later; early operation is therefore indicated, but attacks frequently subside for the time being and if the general condition is good, and the attacks appear to be subsiding it may be well to wait till jaundice has passed

*Read before the New England Surgical Society at its Annual Meeting, September 30, 1932.

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for reactionary hemorrhage was a feature in two fatal operation cases. Intramuscular injections of calcium chloride and subcutaneous injections of hemostatic serum are indicated both before and after operation. The immediate surgical indication is choledochostomy with removal of the stones. The stones causing intermittent obstruction and back pressure must be taken away; the infected ducts must be freely drained for several weeks. It is not always possible to remove all the stones. They may stretch far up into the liver. The common hepatic and common bile ducts are usually large enough in these cases to admit the finger down to the ampulla, and up to the bifurcation into right and left hepatic ducts. Stones in the latter may be dislodged with a scoop or by a gentle stream of saline introduced beyond them by a catheter or other tubular instrument. If further small stones are felt far into the liver substance and cannot be dislodged, it would appear to be sound treatment to perform a secondary hepaticodochoduodenostomy (though I have not yet done this operation for intrahepatic stones). Generally the patients are too ill for this to be attempted at the first operation, but where stones have been left behind in the liver this procedure should be considered some six weeks later. The duodenum is retracted downwards by a stay-stitch after the peritoneum along its upper border has been transversely divided. The dilated common bile duct is freed and divided. The cut distal end is sewn over whilst the cut proximal end is implanted into the duodenum. Further stones as they come down will pass harmlessly into the alimentary canal. The biliary system will be freely drained. . . . The question arises whether the gall-bladder should be removed or drained if it does not contain calculi and if it serves as a safety-valve reservoir delaying and often preventing the onset of complete suppression of bile, removal should not be undertaken. . . . Mann, of the Mayo Clinic, showed that dogs would survive the two-stage removal of the liver for several weeks if freely supplied with glucose, but would die in forty-eight hours otherwise. Glucose is clearly indicated both as a pre- and postoperative measure for these cases of intrahepatic stone-formation with greatly impaired liver function." Dr. Digby gives five cardinal signs or symptoms of this condition. When all signs are present he says, "The syndrome is so distinctive and so unlike that of other diseases that it may be described as pathognomonic. These five cardinal signs are the following:

1. Pain.—In the epigastrium and right hypochondrium.
2. Enlargement of Liver (and of gall-bladder).
3. Rigors.
4. Jaundice.
5. Albuminuria.

A noteworthy case as regards etiology and treatment is thus described by Sir Berkeley Moynihan[4], "Enlargement of the spleen is noticed in cases of stones in the gall-bladder and the duct, but sufficient regard has not been paid to the possibility that it is from the spleen that the infective agent is immediately derived. There are cases in which a large number of small stones are found throughout the substance of the liver, not only in cases of cirrhosis, but in cases where the liver appears little if at all changed from the normal. And every surgeon is familiar with cases of recurrent gallstones in which the common duct and all the ducts of the liver within reach are filled with mud and fine stones, which may be washed down in almost unending quantities. In such cases I pass several tubes up into the liver, and apply the Carrel method of intermittent irrigation for several weeks. About ten months ago I operated on such a case in which seven operations had been performed. I dealt with the bile ducts as I have described, and then removed a spleen that was enlarged to approximately thrice the normal size. Since that time no attacks of pain or jaundice have returned, and as this is by far the longest interval of freedom the patient has had for some years, I am hoping that we may have cut off the source of supply of the infecting organisms to the liver. Splenectomy for recurrent cholelithiasis may be found necessary in similar cases. One of the functions of the spleen is to filter out micro-organisms and toxic substances from the blood-stream, and to send them to the liver for destruction."

It formerly was a mooted question whether stones containing cholesterin formed within the liver or in the gallbladder. From our present knowledge we know that the origin may be both in the liver and the gall-bladder, although perhaps the most frequently occurring stones in the liver are composed of bilirubin-calcium.

It is unnecessary to discuss the etiology of gallstones here. Draper[5] says, "Suffice it to mention the chief conclusions of Baemeister that the causes of cholesterin deposits are not the same as those of calcium-bilirubin precipitation. With the former the presence of bacteria greatly facilitates precipitation but is not absolutely essential; for cholesterin is thrown out of sterile bile after long standing at body temperature. With the latter however chronic inflammation of the bile passages is a prerequisite. For mixed stones both causes are necessary. Of course the one common factor is stagnation of the bile."

Boyd[6] says, "In some cases at least the first step in the development of gallstones may consist in this formation of cholesterol deposits."

The mechanism of the passage of early concretions from the gall-bladder to the intrahepatic ducts upstream has been explained by Naunyn (page 96) "Emerging from the gall-bladder

the calculi enter the cystic, thence pass into the common duct but they can also without difficulty pass into the trunk or principal branches of the hepaticus since after they have passed along the cysticus, and have reached the entrance of the common duct they can easily be pushed in the direction of the liver by aforecoming calculi or bile, if their passage into the common duct is rendered too difficult by resistance, as for example when the duct is already filled with calculi."

Our experience with intrahepatic cholelithiasis on the operating table consists of two cases.

Our first case is that of a woman, aged fifty, for the removal of a stone from the intrahepatic tributary to the left hepatic duct. The patient had been previously operated and her gall-bladder had been taken out for gallstones. After the operation she was incapacitated for one year with a marked loss of weight and strength. She had been deeply jaundiced for six months previous to the operation. She was operated April 19, 1919. She came to the operation in a debilitated condition with myocarditis and hepatitis. At operation a stone, the size of a small strawberry was found impacted in the intrahepatic tributary to the left hepatic duct. It could not be moved. An incision was made through the liver substance into the intrahepatic duct using the finger in the hepatic duct as a guide and the stone loosened and removed. She died in forty-eight hours after the operation. This stone had been in the common duct and in manipulating it, it slid into the intrahepatic tributary of the left hepatic duct and became impacted, an incision was the only way to extract it. The disappearance of this stone and impaction in an intrahepatic duct give a clue to the not infrequent disappearance of stones from the common duct.

The second case was a woman, aged forty-one years, multipara, operated by us February 7, 1930. At operation the liver was found to be enlarged. The edge of the right lobe was three fingerbreadths below the costal margin. Stones were found in large number, large and small in the gall-bladder. The gall-bladder wall was thickened. There were also stones in the common duct and in the common hepatic duct and there was a collection of small stones and sand impacted in the liver substance at the exit of the left hepatic duct from the liver. This indurated area was the size of a twenty-five cent piece. A number of small stones and sand together with bile and mucus flowed down from the intrahepatic duct into the left hepatic duct. This latter duct was distended to the size of an adult's index finger. These stones were removed until the hepatic and common duct were apparently free from stones; the hepatic duct was then drained with a large tube. Incidentally in taking out the gall-bladder a duct the size of a wooden toothpick was cut. This was a right accessory hepatic duct which came from the hilus to the wall of the gall-bladder and coursed from there to the common duct. When this was cut the proximal end was tied and the distal part was inverted into the common duct. During her convalescence she was in the hospital for six weeks and was incapacitated for several months afterwards. In the hospital there was continuous tubal drainage of small stones and sand for six weeks when the drainage tube was taken out. After she left the hospital there was continuous drainage of bile and sand and small stones for six more weeks. Sand was also present in the feces. Five months after the operation she became jaundiced for the first time and this jaundice continued for six weeks at the end of which time she passed a large stone through the bowel and from that time the jaundice cleared up. This was a large, soft, sausage-shaped stone, and it came after a severe attack of upper abdominal pain. She was last seen in September, 1932 when she had an attack of pain and soreness in the right upper quadrant. This was a half-girdle pain starting in the epigastrium and extending to the right hypochondrium and to the back. This attack continued for two days and then subsided. She said the attack was similar to the attacks she had previous to the operation. During this attack she had jaundice. There is a question here whether it would not have been advisable to have performed a hepaticodochoduodenostomy.

The following is a chemical report of a stone from the intrahepatic duct:

Cholesterin—Large amount.
Fatty Acid—Small amount.
Bilirubin—Positive.
Calcium—Positive.
Phosphates—Negative.

It is with diffidence that I have only two cases to refer to out of the 2011 operations on the biliary tract done by the members* of our small clinic. Had we examined the liver more carefully during the operations, we perhaps would have had more cases of intrahepatic cholelithiasis to report.

While most of the reports of intrahepatic cholelithiasis hitherto have come from the autopsy-room, modern surgical literature shows that, not infrequently, operations may effect a cure. Noteworthy is such a case of Lewisohn as reported in the transactions of the New York Surgical Society, April 12, 1922 by the President, Dr. John A. Hartwell. "Dr. Richard Lewisohn presented a man, thirty-nine years old, upon whom he had operated seven years ago at Beth Israel Hospital. The patient was suffering from severe pains in the right epigastrium, with fever, chills and marked rigidity (peritoneal irritation). Preoperative diagnosis: acute cholecystitis or perforated duodenal ulcer. Immediate operation revealed that the patient was suffering from intrahepatic cholelithiasis. The whole surface of the liver was studded with innumerable small tumors which simulated malignancy. Incision of one of these small nodules revealed a few small gallstones. Upon further exploration it was seen that one of these pseudo-tumors, situated at the under surface of the liver, had ruptured spontaneously, thus giving rise to the acute symptoms.

The gall-bladder contained half a dozen stones, entirely different in size and color from those found in the liver. The gall-bladder was drained and the operative field packed with gauze.

The patient made a good operative recovery. A biliary fistula closed spontaneously after eight months. The patient was readmitted two years later to the same hospital with recurrence of symptoms and operated by Doctor Goodman. No

*Doctors M. F. Fallon, W. F. Lynch, J. C. McCann, J. M. Fallon.

stones were found in the gall-bladder. A cholecystostomy was performed. The patient had a profuse postoperative hemorrhage (cause unknown) which required a revision of the operative field and several transfusions of blood. He has had several light attacks of gallstone colic during the last few years.

Doctor Lewisohn stated that this patient represented a unique case, i.e., spontaneous perforation of intrahepatic gallstones. This case was published in the *Annals of Surgery*, 63:535, 1916. It was certainly remarkable that this patient was in good health today without jaundice, though the hepatic ducts with all their branches were filled with stones.

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RECURRENT OR INTERMITTENT JAUNDICE IN YOUTH*

BY WILLIS E. HARTSHORN, M.D.†

FROM the standpoint of surgical intervention jaundice in youth is perhaps limited to those cases in which the obstruction is due to stones, enlargement or calcification of the mesenteric lymph nodes from tuberculosis with subsequent pressure on the bile ducts, occasionally to ascaris and to those cases of hemolytic jaundice and Banti's disease where a splenectomy is a life-saving procedure.

The literature on the subject is profuse, but when limited to early life we find its surgical aspects within comparatively narrow confines.

Persistent jaundice over a term of years without anemia is rather unusual in young people. In making a diagnosis, clinical and laboratory findings must be correlated, family history considered, and previous disease such as typhoid, tuberculosis and malaria investigated.

For the purpose of this paper jaundice can be simply classified as obstructive; hemolytic including hereditary or familial hemolytic; cirrhotic including primary hypertrophic cirrhosis or Hanot's disease and the types due to toxemia and infection.

Obstructive jaundice is of course not a condition that is peculiar to any special age. Obstruction due to stones, however, is rare under the age of twenty. In a number of instances where stones have been diagnosed as such in youth, x-rays taken later have disproved the findings. These cases are much more apt to prove to be catarrhal jaundice.

To illustrate this point a child was admitted to the hospital, aged 12 years. Marked abdominal pain referred to the right upper quadrant. Associated with jaundice were fever and delirium indicating an acute infection. Icteric index 25. Non-protein nitrogen 25 mg. Sugar 25 mg. in 100 cc. of urine. Some pus in urine. Van den Bergh direct positive. Indirect 5 units bilirubin. Bleeding time 45 seconds. Clotting time 3½ minutes. Stools very light brown.

Graham test showed normal contour of the gall-bladder, which was 3 x 6 cm. in size and contained what appeared to be a group of small calculi about 2 mm. in diameter. Two hours after the ingestion of a fat meal the gall-bladder was practically empty. A repeat x-ray showed no calculi present.

Hemolytic jaundice presents certain rather definite clinical and laboratory findings. They might be listed as follows:

In many cases a familial history of jaundice.
Stools bile stained due to excessive bilirubin.
Absence of bile from the urine.
Moderate enlargement of the liver and usually a palpable spleen.
Comparatively small decrease in the red cells and hemoglobin.
Reticulocytes increased.
Increased fragility of the red cells.
Platelets normal or slightly increased.
Howell-Jolly bodies in smear when vital staining is employed.

It is therefore easy to differentiate it from Banti's disease with the associated anemia and large spleen or Gaucher's disease with the splenomegaly due to the presence of rather typical vesicular cells and relatively low-grade anemia.

In this connection as diagnosis is often confusing and as the condition is mentioned subsequently, note should be made of primary hypertrophic biliary cirrhosis or Hanot's disease because this does cause at times a very marked jaundice intermittent in character and presents symptoms somewhat as follows:

Persistent jaundice over a period of years.
Occasional pigmentation of the skin.
Urine bile stained.
Marked enlargement of the liver without ascites.
Moderate without enlargement of the spleen.

*Read before the New England Surgical Society at its Annual Meeting, September 30, 1932.

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Exacerbations with fever.

Clubbing of the fingers.

Hemorrhages from the mucous membranes during the later stages.

Secondary anemia with increase in the polymorphonuclear leucocytes during exacerbations.

These different conditions have been briefly reviewed because it is true that every case of recurrent or persistent jaundice in youth presents a definite problem in diagnosis. In considering this particular phase of the subject we will eliminate two of the most common types, jaundice in the new born and catarrhal jaundice. We will also limit the age of patients to those under twenty years. Perhaps it will be most interesting to let the cases range from two to this age.

The subject is probably more medical than surgical, the vast majority of cases being handled by the internist. However, the surgeon is occasionally called in consultation where the jaundice is very persistent. For a number of years the writer followed a case of this type through periods of fairly intense jaundice succeeded by a remission of the symptoms. This continued for five years. The age range over this period was from eight to thirteen. Previous to the age of eight the development had been that of a rather poorly nourished child, mentality unusually keen, somewhat precocious. During this period she took no cod liver oil, strongly resisting any attempt to enforce this medication.

Shortly after the age of eight years the first attack of jaundice came on. This was of moderate grade, without nausea or vomiting, with clay colored stools. Urine bile stained. In contrast to the usual poor appetite she was unusually hungry. Jaundice persisted ten days then cleared up.

Second attack one year later at age of nine years. Onset duration and character similar to previous attack. Slightly deeper jaundice. Urine bile stained. Stools very light. Recovery uneventful. Diagnosed as catarrhal jaundice.

Third attack at eleven years of age. Commenced in January, 1930, followed by deeper jaundice varying at intervals in intensity. Latter part of February it seemed to decrease for a short period. Stools varied in color from clay to brown. No symptoms during the attack except itching. Bile constant in urine. Appetite increased. Was not running a temperature. Her condition remaining unchanged on April 15, 1930, she was admitted to the Pediatric service at the New Haven Hospital for observation and study.

Family History:

Mother aged 39. Two pregnancies. No abortions. No still births.

Children: 1—Patient June 26, 1919.
2—Lived only 8 hrs. Placenta praevia.

No history of tuberculosis, diabetes, rheumatism or typhoid. No member of her family ever had jaundice.

Father 39. Well. One sister had slight jaundice when two years of age. Lasted only a little time. No familial history of tuberculosis, typhoid or diabetes.

This child: Birth spontaneous, easy, normal, no jaundice. Weight 5¾ lbs.

Feeding: Breast-fed for nine months. Then weaned.

Development: Within normal limits, head up at 3 months, sat up at 8 months, talking early and walked unassisted at one year of age.

Illnesses: Whooping cough and chicken pox, both at about one year of age.

Operations: None. Injuries none.

Physical Examination on admittance: A well-developed, poorly nourished child, the body being moderately jaundiced all over. Most marked over neck, chest and abdomen. Slight prominence of bosses.

Ears: Drums normal.

Eyes: Lemon yellow sclerae. Pupils equal, reacting to light and accommodation.

Nose:—Not obstructed. No discharge.

Tonsils present suggesting a chronic inflammatory condition. Pharynx not injected.

Neck supple. Posterior cervical glands slightly enlarged. No thyroid enlargement.

Chest: Long type. Well-marked rickety rosary. Expansion good and equal. Breath sounds clear. No râles. Glands in the left axilla palpable.

Heart: Not enlarged. Sounds of good quality. Regular rhythm. High pitched rough systolic murmur heard best at apex.

Abdomen: No evidence of ascites. Liver palpable about 1½ cc. below the costal margin. Suggestion of tenderness in the region of gall-bladder. Liver can be felt in intercartilaginous space below the sternum in mid line and extends well over below the left costal margin. The spleen is felt on inspiration under the ribs somewhat enlarged. Inguinal lymph nodes palpable.

Radiographic examination of abdomen and pelvis: Flat Plate. No evidence of calcified lymph nodes. No evidence of biliary calculi without dye. It was not considered wise to try a Graham test owing to the possibility of a severe reaction. No stones in kidneys, ureters or bladder noted. G. I. Series: No evidence of gastric or duodenal ulcers. Intestines normal. Barium enema: Barium progresses to cecum. No definite filling defects were noted in the walls of the large intestine. Sigmoid somewhat redundant.

Laboratory findings: Bleeding time 2½ min. Clotting 21 min. Red cells 4,410,000. 90% hemoglobin. Reticulocytes normal. Platelets normal. White cells 11,350. Polys 51%. L. M. 26. S. M. 17. Eosin .3.

Fragility test*: "Normally in graded strengths of salt solution, hemolysis will begin at about 0.44 per cent salt solution and will be complete at about 0.34 per cent. In typical cases of hemolytic jaundice the hemolysis may begin as high as 0.70 per cent and may be complete at 0.46 per cent. . . . The increased fragility of the red blood corpuscles to hypnotic salt solution is pathognomonic."

In the case reported the fragility was about normal. Hemolysis starts .36%. Not complete .28%.

The icteric index was 50. Normally this should be from 4-6.

"The index is a number representing the color value of the serum as matched in a colorimeter against a 1: 10,000 potassium dichromate solution."†

Tuberculin test negative. Wassermann negative.

Van den Bergh Test: Direct, negative. Indirect, 8.3—normal, .4—1.4.

Repeat: Direct, negative. Indirect, 7.4.

*Lee, Roger I.: Edited by Blumer, George: Bedside Diagnosis. Philadelphia, W. B. Saunders Company. 2:714, 1928.

†Tileston, Wilder: Edited by Blumer, George: Bedside Diagnosis. Philadelphia, W. B. Saunders Company. 2:5, 1928.

"Two types of reaction occurred on adding Ehrlich's diazo reagent to the serum from cases of jaundice, (1) the *prompt* direct, in which a deep red-violet color develops within less than a minute, and (2) the *negative* or *delayed direct* reaction, in which there is either no color, or it first appears after an interval of fifteen minutes or longer. . . .

"The prompt direct is given by normal bile and by the serum of obstructive jaundice; the second by normal serum, and by the serum in hemolytic jaundice.

"Van den Bergh believes that these two kinds of reaction correspond to two different forms of bilirubin, the negative direct reaction being due to some compound of bilirubin which is broken up by alcohol.

"To these two types may be added a third, the *biphasic reaction*, in which there is an immediate faint red color, which gradually deepens. This sometimes occurs in conditions in which jaundice is due to damage to the parenchymal cells of the liver.

"The quantitative estimation of bilirubin is carried on by the indirect method, after the addition of alcohol. . . . The results are usually expressed as units; one unit corresponds to a strength of 1:200,000, or 5 mg. per litre; the amount normally present by this method varies from 0.2 to 0.6 unit, or one to three milligrams per litre."

It was not considered advisable to use the Graham test (as has already been mentioned).

Stool normal, no worms. This patient gave a previous history of having passed a round worm. Some mucus. Occasional cell. The possibility of a worm causing the obstruction was considered and a vermifuge had been given several times before admittance to the hospital without any result.

Urine: Bile four plus. Urobilin plus. Albumen none. Sugar none.

Wilder Tileston in Blumer's Bedside Diagnosis states that "Urobilin never appears as such in freshly voided urine but is formed from urobilinogen on standing by the oxidizing action of light and air. The presence of pathological amounts occurs under two conditions, (1) when the oxidizing function of the liver is impaired and (2) when owing to excessive destruction of the red cells, the bile is abnormally rich in pigment and the liver therefore received from the intestine an amount of urobilin which is beyond its capacity to handle. Examples of one are chronic passive congestion, catarrhal jaundice, cirrhosis. Examples of two are pernicious anaemia, hemolytic jaundice, transfusion of incompatible blood and paroxysmal haemoglobinuria."

The analysis of the case outlined suggested more a jaundice due to obstruction of some type rather than a condition due to familial, cirrhotic, or hemolytic jaundice. It was therefore referred to the Surgical Service for consultation. Exploratory laparotomy was advised as it was felt that the continuance of the jaundice would be fatal involving probably necrosis of the liver. This was not accepted by the parents of the child and she left the hospital with little improvement. She was in the hospital from April 15, 1930 to May 2, 1930. From this time to the date of her death from septicemia on April 20, 1932 a period of nearly two years she was constantly jaundiced. This varied in degree. The stools were rarely very light in color and there was always bile-stained urine. The septicemia followed an infection of the throat on April 15, 1932 with a temperature of about 104 degrees. I am indebted to Dr. Dean W. Marquis of East Orange, N. J., for the account of this last illness. Associated with the high temperature were headaches, pain in the region of her post lymph nodes which were swollen and tender, nausea and vomiting. A temperature of 105 degrees with chills and a recedence to normal followed. The blood culture taken was positive for streptococcus, (short chain).

Dr. Marquis suggests that from the club fingers, the ascites, spleen and liver enlargement, oozing of blood from the esophagus and mucous membranes of her mouth and the absence of fragility of the red blood cells she had Hanot's cirrhosis in a late stage with portal obstruction.

Through the kindness of Dr. Arthur R. Abel, Director of the Edison Pathological Laboratories, Orange Memorial Hospital, Orange, New Jersey I am able to append the autopsy report.

Autopsy:

Anatomical Diagnosis: Primary Cause of Death, streptococcus septicemia.

Contributory Cause or Causes, biliary cirrhosis.

Macroscopic Data:

Body of a girl, aged 13. Jaundice uniformly distributed.

Abdomen distended and filled with straw-colored fluid which at first appears clear, but as it flows over the coils of the intestine it is found that the fluid contains white or gray flecks which render it very cloudy.

There are no adhesions between the loops of intestines and the abdominal wall. The large bowel is distended by gas and contains a sticky black material.

The loops of the small bowel are collapsed and appear quite normal with the exception of many minute petechial hemorrhages which although very small are so close together and so numerous that they give the intestines a dusky red color.

The stomach is filled with a dark brown secretion but with the exception of petechial hemorrhages there are no evidences of any bleeding surfaces.

The appendix is long, swollen and contracted into separate segments.

The spleen is enlarged to about *six* times, weighing 576 gm. and shows large healed infarcts on its surface.

The kidneys are enlarged and the surface dotted with numerous petechial hemorrhage. Both kidneys have anomalous blood vessels which in lower pole of the kidney cross the ureter.

The liver presents a condition in which both hypertrophic and atrophic cirrhosis are found.

The left lobe and the superior surface of the right lobe are contracted and firm while the caudate quadrate and the lower portion of the right lobe show hypertrophy of considerable degree. The liver on cross section shows hypertrophic nodules surrounded with white bands of fibrous tissue. The nodular areas protrude from the cut surface.

Gall-bladder is greatly distended, but is thin walled and the bile escapes through the ducts into the duodenum.

Lungs show no abnormalities but are crepitant throughout with the exception of numerous small dark brown areas scattered over the surface which appear to be consolidated.

Heart small. Muscle firm. Valves normal. There are petechial spots on the left ventricle near the tip.

Microscopic Data: Biliary cirrhosis. Not Hanot's cirrhosis.

Biliary cirrhosis is indeed a complicated condition. Far be it for a surgeon to attempt any discussion of its many ramifications. Suffice it to again quote Tileston in Blumer's Bedside Diagnosis when he says in substance that Primary Hypertrophic Biliary Cirrhosis or Hanot's Cirrhosis is a form characterized by chronic jaundice and marked enlargement of the liver and

spleen in the absence of ascites. It is commonest in young people between the ages of twenty and thirty. From time to time exacerbations occur, with fever, pain over the liver and spleen and increase in jaundice. It is a rare disease. Chronic hemolytic icterus and portal cirrhosis with enlarged liver are often mistaken for it. The causative agent has not been discovered.

The blood usually shows an anemia of a secondary type.

In the case which I am reporting there was very moderate enlargement of the liver with no ascites until it appeared as a complication of the secondary septicemia, when the spleen rapidly increased in size.

There was no fever at any time. The red count was 4.410.000. The Hbg. 90%.

If the condition was due to chronic hemolytic jaundice we should have had increased numbers of reticulocytes and increase in the fragility of the red cells associated with the absence of bile in the urine.

I realize that too much reliance should not be placed on the laboratory findings but in this case they did not point toward a medical solution of the problem and therefore in order to save the life of the patient surgical intervention would have been justified; particularly is this true in view of the final outcome which was directly due to lowered resistance caused by the persistent jaundice.

Excluding jaundice in the new-born of 16 cases admitted recently to the hospital below the age of 20 years, six were diagnosed as catarrhal, five were hemolytic two of these requiring splenectomy, three were of the infectious type, one due to hepatitis and one diagnosed as due to cholangitis.

CONCLUSIONS

1. The blood picture must be thoroughly investigated before offering surgical interference in persistent jaundice before the age of twenty.
2. The use of 10% calcium chloride as a preoperative measure will eliminate practically all danger from hemorrhage.
3. Splenectomy is indicated in hemolytic jaundice with large splenic tumor. In cases such as that reported it would be of doubtful value.
4. Diagnosis is often difficult but liver necrosis and death are sure if jaundice persists over a period of years without relief. Exploratory operation is therefore indicated in atypical cases.

DISCUSSION

DR. ROBERT C. COCHRANE, Boston, Mass.: I hasten to state that I have had no personal experience with these stones, in discussing Dr. Fallon's paper. In looking through the literature, I came across one series, 17,568 autopsies in which in only seven cases were intrahepatic stones found, which shows they are not very common.

I consulted with the Pathological Department at the Boston City Hospital and they had but one case of intrahepatic stone on record.

My impression, in going over a small amount of the literature, was that these cases when they do occur are just as likely to occur in people in the younger decades as in the older ones, which is more or less in contrast to the ordinary incidence of gall stones. Also I gathered the impression that when intrahepatic stones were found, they are always found in the presence of extrahepatic stones and not alone.

The one patient on record in the Pathological Laboratory at the Boston City Hospital, curiously enough, was a Chinese, a male of nineteen years, and the history in the case was not at all different from the history of any common duct stone. He had acute pain in the epigastrium which was referred to the back. He had temperature. He had a history extending back six years of previous attacks, and also fat indigestion. At operation stones were removed from the common duct and the gall bladder and he died shortly after the operation. The autopsy was negative except for the liver; that is, the spleen was not enlarged, and from the findings I gather that the gall bladder was not contracted, which is in line with what Dr. Fallon said about the enlargement of the gall bladder in cases of intrahepatic stones.

I will quote from the report of the autopsy report as far as the liver is concerned:

"The ramifications of the bile ducts in the liver were followed by incising them. Just at the origin of the hepatic duct there was a collection of hard, black, viable stones, the largest 1 cm. in diameter and 2 cm. long. Throughout the liver the bile ducts contained clusters of or individual stones of various sizes and shapes. Gravel-like deposits are present in the very ends of the larger ducts in the periphery of the liver. Practically none of the moderate-sized ducts are free from stones."

DR. SAMUEL C. HARVEY, New Haven, Conn.: I should like to start my discussion also with the statement that I am not personally familiar with the primary hepatic stone. It seems to me that it is important to make a distinction in a discussion of this kind between those stones that arise primarily in the intrahepatic ducts and those that reach the intrahepatic ducts by a retrograde process from the common duct.

I think the best indication of which I know of primary stone is the report that Dr. Fallon has made of Professor Digby's observations in Hongkong. The Chinese have a very curious

propensity, as you probably are aware, for the formation of stones in the urinary tract, at least in the neighborhood of Canton, and in Southern China, for the surgeons there have bladder stones by the wheelbarrowful. In the tropical and subtropical districts of China—and this is true of all countries perhaps—diseases of the liver which we never see or know about are exceedingly common, and I presume it is quite possible under these circumstances that a primary infection of the liver itself may lead to calculus formation.

It seems to me that with that group excluded, primary intrahepatic stone must be extraordinarily rare, and it must arise as the result of obstruction of the common duct, stasis and infection. That in itself, of course, most commonly arises from obstruction and infection in the gall-bladder. I believe in most instances in which we speak of intrahepatic stone, that the primary source of the disease is probably in the gall-bladder.

Where I have seen intrahepatic stones is in the ampulla of Vater. In one or two instances having removed all common duct stones as I supposed and then having established the potency of the ampulla of Vater, I have found after a few weeks that there was still another stone there. This presumably has been lodged in the hepatic duct at the time of the first operation and had later come down.

Dr. David W. Parker, Manchester, N. H.: I have had no personal experience with the particular type of case reported by Dr. Hartshorn. I not uncommonly, however, see cases of jaundice in children, particularly young children, associated with anemia and splenomegaly; that is, the hemolytic anemias.

These anemias, as for instance, congenital hemolytic, von Jaksch's erythroblastic anemia, leukemia, and Banti's disease all have certain distinctive characteristics, but the final court in the differential diagnosis is the blood picture.

I will not discuss the characteristics of the blood in these several conditions because I am sure that most of us consult a hematologist for blood diagnosis, and a correct differential diagnosis is important if unnecessary surgery is to be avoided. In certain of these anemias, as for instance the congenital hemolytic icterus, wonderful results are obtained from splenectomy, while in others, as, for example, erythroblastic anemia, removal of the spleen seems to have no influence on the course of the disease.

I will not take up any more of your time as Dr. Ladd has a slide giving the statistics from the Children's Hospital of Boston on these anemias which is very enlightening and conclusive.

Dr. William E. Ladd: The subject of jaundice in youth and especially that associated with splenomegaly has been confused by the lack of uniformity in nomenclature and the fact that the histology of the spleen is very similar in conditions which clinically are very different. There are a few facts, however, which are clear. The diagnosis is of extreme importance and is largely made by the blood examination. This slide which was made up by Dr. Diamond in the blood laboratory of the Children's Hospital shows the striking characteristics found in the blood in these various conditions.

In familial hemolytic jaundice one finds 30 per cent reticulocytes, fragility test running from 70-40 and increased excretion of urobilin.

In idiopathic purpura a low platelet count is the striking feature in the blood examination.

In erythroblastic anemia a tremendous increase in the nucleated red blood cells is the diagnostic finding.

In Banti's disease the white count tends to be low and the platelet count up.

Splenomegaly with gastric hemorrhage and Gaucher's disease shows no striking blood changes.

Splenectomy has been recommended for all these conditions.

At the Children's Hospital splenectomy has been done on three patients with Gaucher's disease with improvement, and on four patients with splenomegaly with gastric hemorrhage. These four showed slight or no improvement. Seven patients with Banti's disease had splenectomy performed. These patients showed slight to moderate improvement. There were seven patients with erythroblastic anemia, none of whom were benefited by splenectomy. It is not to be recommended for this condition. Three cases of idiopathic purpura have improved following splenectomy. In patients with hemolytic jaundice, I think splenectomy is very clearly indicated and it has been our experience and the experience of others that we get extremely good results with splenectomy for this condition.

During the past six years we have observed eight children with familial hemolytic jaundice. Of these eight, six have been subjected to the operation of splenectomy. Two are recent patients and I presume will be operated on presently. Of those six patients who have been operated, five were done before 1931 and have been followed. The average erythrocyte level before operation was 2,000,000. The average hemoglobin was 30 per cent and the average of reticulocytes was 30 per cent. The fragility of the red cells averaged from 0.7 to a completion of 0.4. There was a constantly increased amount of urobilin in the urine and increased bilirubin, both of which in addition to anemia, were evidence of excess of blood destruction going on in the circulation.

After operation on these five cases, the av-

erage erythrocyte level has been 4,500,000, hemoglobin has been 90 per cent; the reticulocyte count has dropped to 5 per cent, the fragility six to three. The urobilin excretion has been practically normal and there has been no visible icterus at any time.

All these patients have been entirely free from symptoms, whereas, before operation, frequent hemolytic crises occurred both without and accompanying respiratory infections.

I think that has been the experience of everybody else who has followed the same procedure and I think it is very clearly indicated that splenectomy should be done in these cases of hemolytic jaundice.

DR. FRED B. LUND, Boston, Mass.: I don't know much about anemia but surgeons are frequently asked to see cases of persistent jaundice started as catarrhal jaundice, and they are expected to decide whether to operate on them. I have been coming in contact with cases of acute yellow atrophy of the liver, generally not involvement of the whole liver but a certain part of it.

There was a child 2 years old admitted to the Carney Hospital last winter whose father had a positive Wassermann, a healthy looking child, well nourished, who had had an attack of jaundice about six months before that lasted a month. It had been quite severe. She was admitted to the medical side and was kept several weeks and finally a tumor was felt and I was asked to see the child to decide whether it was obstructive jaundice, and whether it would be benefited by operation.

I felt the edge of the right lobe of the liver, which seemed enlarged. It was rounded and I could distinctly feel the gallbladder and I said, "This child must have some congenital or other obstruction of the common duct," and I would have operated if the condition of the child had not been too poor to make it advisable. The child died within twelve hours after breaking out with purpura.

An autopsy was done. The gall-bladder was distended with no obstruction of the duct whatever, but in the center of the liver was a tumor mass which was said by the pathologist to be due to a cirrhosis, an attempted repair from an old attack of acute atrophy. This accounted for the child's previous attack of jaundice.

So, we can't always be sure in these cases that Courvoisier's law holds good. I have had several cases in adults that proved to be acute yellow atrophy of the liver.

In a young woman, too old to call a child, i.e., about twenty, there was persistent jaundice of this sort and, after watching her a long time, I thought we had better find out what the trouble was. At operation there was found to be a chain of considerably enlarged glands along the common duct. The gall-bladder was drained, she was given supportive treatment, and her sinus healed up and she went home free of jaundice. Whether she came back again I do not know, but there is no question that the cause of that was pressure from enlarged glands on the duct. They didn't look like tuberculous glands and what the reason for the enlargement was I do not know.

DR. JOHN W. KEEFE, Providence, R. I.: *Mr. President and Gentlemen*—I wish to say but a few words about an autopsy that I performed some thirty years ago. There were stones in the gall-bladder, in the common duct, and through all the ducts in the liver. We counted over a thousand stones we had taken from the liver. In my career I have always borne in mind that it is possible to have stones in the ducts of the liver. Sometimes when we have removed stones from the common duct and gall-bladder, another stone may come from the liver and enter the gall-bladder or common duct. The surgeon is thought to be at fault oftentimes by the patient who goes to another surgeon who says, "He left a stone behind." Yes, he did, but it might have come down from the liver, so we should bear that in mind in defense of our practice of surgery.

These patients with stones in the liver are not all Chinese. In Providence we have an asylum to which only natives of Providence are admitted. The autopsy I reported was performed at this place, so that this is a case of a native having a stone in the liver ducts.

DR. MICHAEL F. FALLON: I think, Mr. President, that Dr. Keefe's comment on stones in the common duct should be emphasized and that we often blame ourselves for leaving stones in the common duct when perhaps they come down from the liver.

I am thoroughly convinced from my study of the literature and experience of other surgeons that hepatic cholelithiasis is a surgical entity, and I think as I said during my talk, that when one is finished, has operated on the gall-bladder and stones, particularly in the common duct, he should look at the hilus of the liver to see if there are stones coming down from the branches of the hepatic duct.

Massachusetts Medical Society

THE PRESIDENT'S ADDRESS*

BY HALBERT G. STETSON, M.D.†

AT the meeting of the Council of this Society held October 5, 1932, the following resolution was offered and adopted:

> "Whereas, the Annual Meeting of the Fellows of the Massachusetts Medical Society has of late years become a meeting devoted chiefly to perfunctory business matters:
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> "Be it resolved, that the President of this Society be asked to prepare a brief address, to be presented at the Annual Meeting as a part of the business of that meeting, in which he may review the affairs of the Society, and make such recommendations for action by the Council as may seem to him expedient."

This resolution was offered by one of the Ex-Presidents of the Society and was based upon his observation and experience while occupying the office of President, that the duties of the President at the meeting of the Council and of the Society, are largely those of a presiding officer; that no opportunity was given him at any time during his term of office, to bring before the Society, as a body, certain thoughts that came to him from time to time, that pertained to the functions and activities of the Society. In order that certain ideas and views regarding the work of the Society might be acted upon, it was necessary for him to take the matter up with representatives of the various Standing Committees, and have the matter brought before the Council through them. My own experience during the two years of my incumbency as your President, has rather forcibly brought to my attention the truth of this statement. One cannot serve this Society as its President for a period of two years without occasionally having some thoughts that he would like to have the opportunity of presenting in a more general and more forcible way than opportunity has so far offered. I am heartily in favor of the continuance of this mandate of the Council.

The motion reads "that the President be asked to prepare a *brief* address, to be presented at the Annual Meeting, as a part of the business of that meeting". As I look upon this new function that is placed upon the President, it seems to me that it cannot always be a "brief address"; that some matters coming to the attention of the President, and matters, which he feels that the Society should take under more serious consideration than has been the case in the past, often demand a rather complete explanation as an excuse for these matters being brought to your attention. It further states that "this address shall be presented at the *'Annual Meeting'* as a part of the business of that meeting".

All of you are more or less familiar with the administrative meetings of the Society. Taking this year as an example you will note that the meeting began on Monday, June 5, that the meeting of the Council took place on Tuesday at noon, June 6, and it is at the Annual Meeting of the Society occurring on Wednesday at noon, June 7, the last day of the meeting of the Society, that the address of the President is scheduled. This leaves no opportunity for any action by the Society, or by its Council, upon any recommendations or suggestions that may be offered by the President. Furthermore, it would seem that Dr. Greenough had this in mind, as the last two lines of the motion read, "and make such recommendations for action by the Council as may seem to him expedient". If it is impossible to act upon any recommendations of the President offered at the June meeting, such action must go over for four months, to the next meeting of the Council, to be held in October. In order that this seeming defect in the wording of the resolution may be obviated, it is my suggestion that the President's address be delivered on Monday evening, preceding or following the Shattuck Lecture, thus giving an opportunity for such suggestions and recommendations, as he may choose to offer, to be acted upon at the meeting of the Council, which occurs at noon on the next day, following which action any votes of the Council requiring the approval of the Society as a whole may be acted upon at the Annual Meeting of the Society on the third or final day of its meeting. Furthermore, it would seem to me a desirable feature if this address of the President "in which he may review the affairs of the Society and make such recommendations for action by the Council as may seem to him expedient," should be referred to some committee for study, and for such recommendations for action by the Council as seem to it to be for the best interests of the Society. I offer this recommendation for discussion and such action by the Council as seems best.

In an address of this character I cannot re-

*Read at the Annual Meeting of the Massachusetts Medical Society in Boston, June 7, 1933.

†Stetson — President of the Massachusetts Medical Society 1931-1933. For record and address of author see "This Week's Issue," page 1324.

frain from calling to your attention, the very efficient work during the year by the various Standing Committees. All have been interested in the particular matters coming before them, and all have rendered valuable and painstaking service for the benefit of the Society as a whole. Two of the committees are perhaps more outstanding in their accomplishments, not because of their greater ability but on account of their greater opportunity. I refer particularly to the Committee of Arrangements and the Committee on Postgraduate Medical Instruction.

Last year we had a most interesting Scientific Exhibit on Arthritis, that was both fathered and mothered by Dr. Robert B. Osgood. This exhibit attracted many visitors and it demonstrated to the Committee of Arrangements that such an exhibit was well worth while. The Committee has benefited by last year's demonstration and this year has enlarged its Scientific Exhibit very much, and has included a number of different displays which should be of much practical value to the visiting membership. I believe that much more attention should be paid to the Scientific Exhibit and it might not be unwise if some member of the Committee of Arrangements could take this as his particular job, that a sub-committee interested in this work might well be appointed to act under the chairmanship of the particular member of the Committee of Arrangements in furthering and promoting this truly educational measure. I would commend this suggestion to the Committee of Arrangements for the coming year for its consideration. For your information may I also say that this committee has sold a larger number of commercial booths than it has ever been able to do before, and the receipts from this source will go far in defraying the heavy expenses always incurred in holding the Annual Meeting. The full financial report of this Committee will be submitted to the Council at its October meeting. I am sure that all of you will join with me in this note of approbation for the valuable and painstaking service of this Committee in our behalf.

I would also like to say a word in commendation regarding the work of the Committee on Postgraduate Instruction and its report to the Council, as outlined yesterday. This report appears in the *New England Journal of Medicine* under date of May 25, 1933, and gives one an idea of its comprehensive plan and scope. If this program as outlined can be carried out, the Committee feels that it should be of great value to the membership of the Society, in that it carries postgraduate medical education to the door of the practitioner by offering the various courses through the district societies. In order that this very valuable program as outlined may be successful, I believe that a very strong effort on the part of leading practitioners in the different district societies, to interest and guide a definite, practical desire for this very educational feature must be made. I am quite convinced of its value if adopted by the different districts, and I am equally convinced that it is the type of service which our State Society owes to its members. I sincerely hope that encouragement may be given this Committee by the different districts, by application for enough of the different courses to effectually demonstrate the value of this plan. A similar plan has been very successful in New York, and I am sure that it can be made equally successful in Massachusetts. Its success, however, depends entirely upon its adoption and its application to their own communities by the different districts.

I desire also to say a word in praise of the work so far carried on by the Special Committee on Public Relations. The problems which they are attempting to solve are serious in so far as they concern the membership of the Society and they are problems which require much time and great tact and resourcefulness if anything of value is to be accomplished. It seems to me from my rather close observation of the work of this committee that a real beginning has been made and that something of definite value will ultimately be worked out—more will be said of the work of this committee later.

In the past year there has been a little discussion among the membership, and in the *New England Journal of Medicine*, regarding the term of service of the President of the Society. It has been customary for many years, as you all know, for this Society to elect its President for a period of one year and to reëlect him for the following year. The Vice-President, on the other hand, has in most instances served a term of but one year. There is much to be said in favor of this custom, and in the past there can be no question of the great value to the Society, of having its Presidents serve for two consecutive years. The knowledge that he acquires in his first year of service, the greater familiarity with the problems that he is called upon to consider, the greater acquaintanceship with the members of the Society and with those outside the Society with whom he is called upon to act, all mean greater efficiency and better service in every way for our State organization. On the other hand, to one who has never held this high office, it is hard to appreciate the great amount of time and sacrifice required in carrying on the duties pertaining to it, and this is particularly true if, in addition to his duties as President, he is also engaged in a more or less extensive medical practice. I can quite believe that in some instances members of the Society, eminently qualified in every way for election to the office of President, would find themselves un-

able to accept this position on account of the time and energy required to properly carry out all of the duties of the office in the way and manner in which he would feel they should be carried out. Whether our present custom shall be continued, whether we shall elect our presidents annually without previous knowledge of the duties required of them, or whether we shall consider the question of a president-elect, preceding for a year his actual incumbency of the office of president, are I believe subjects which should be most carefully considered, and the solution not hastily arrived at. The Massachusetts Medical Society has always been rather slow in adopting any changes in its methods of administration, and I think that most of us feel that this conservatism has been beneficial rather than otherwise. At the same time we should realize the changing tendencies of time, that what amply met our needs at one time may not some years later be so completely satisfactory. Any movement which so vitally concerns the administration of the Society should not be carried out without its first having been very carefully thought out and no action should be taken hurriedly. Such change has been suggested and I bring it to you for your consideration, but with no recommendation as to what action should be taken.

In a recent study of the work of the Committee on Ethics and Discipline there is an element of interest, but not I am sorry to say, one of pride in discovering that this Committee within the past five years has been called upon to investigate the conduct of 104 practitioners, members of this Society, who have been accused of conduct unbecoming a physician in one way or another. It is interesting to note that physicians who have been so investigated are not graduates of any one particular school, but so far as can be learned, all schools are represented without any particular disparagement to any one. Two conclusions come to me in the study of this report, which I feel are of enough importance to place before you. First, greater attention should be paid to the admission of candidates to our Society, by the Censors in the different districts. It is not always possible to exclude the undesirable, by this means, but a few cases show definitely that the physician who ultimately comes before the Committee on Ethics and Discipline should never have been admitted. The character of the work carried on since his admission to the Society was definitely shown by the same character previous to his admission, and should have been known by the Censors of the district. The mere fact that he has been able to pass the medical examination for admission to the Society constitutes, as I understand it, only 60 per cent of the requirements for admission. The remaining 40 per cent applies to ethics, to his standing among his fellow practitioners, and in his more or less public relations in the community in which he lives. One hundred and four studies in the past five years is not large, but I believe that a more careful examination of the ethics and standing of the applicant previous to admission would lessen the number of our undesirable members. Secondly, a study of the work of this Committee, together with some evidence that has been produced in the Committee on Public Relations, would lead me to believe that insufficient attention is placed upon medical ethics and upon business economics in our medical schools. No small amount of the medical graduate's success in life depends upon his knowledge of business ethics and business principles and his relationships with his fellow practitioners, and I believe that more time could be devoted in our medical school courses looking toward a more complete understanding and knowledge of these two subjects. The physician is constantly being criticized by the business man for his lack of business knowledge and business principle, and while the practice of medicine is a profession, it should be governed, if we are to be successful in our contacts with others, by reasonable business judgment and business knowledge. The statement is made altogether too often by the younger practitioner when he begins the practice of his profession, that his knowledge of medical ethics is largely obtained after his graduation. The success of our profession depends, I believe, not upon more business but upon better business.

I think the Society could well afford to consider a change in its Scientific Program for the Annual Meeting. At the present time all of these scientific meetings are held under six sections. These include the Sections on Medicine, Surgery, Pediatrics, Tuberculosis, Radiology and Physiotherapy, and on Obstetrics and Gynecology. The total attendance for the past four years in these different Section meetings has been as follows:

Section	Total Attendance for 4 Years	Average Attendance per Meeting
Medicine	960	227
Surgery	680	170
Tuberculosis	327	87
Pediatrics	440	110
Obstetrics and Gynecology	1421	355
Radiology and Physiotherapy	460	139

As will be seen by these figures, the large attendance comes in the Sections of Medicine, of Surgery, and Obstetrics and Gynecology, a total of four years of 3061, out of a total for all Sections of 4288. Many papers read in the Section of Tuberculosis, the Section of Pediatrics, and the Section of Radiology and Physiotherapy, are and should be, of great interest to the general practitioner, and it seems to me

they could well be arranged as part of the group of papers read before the Section of Medicine and the Section of Surgery, adding much to the interest of the program and offering less opportunity for overlapping. The meetings of these sections are bound to conflict to a greater or less extent, and not infrequently it so happens that one must make a decision as to which of two papers being read in different sections, he wishes to hear. He desires to hear both, and he feels that both will supply him with information which he needs for the purpose of improving the character of his work. Furthermore, both of these papers have been placed on the program, as directly applicable to the general practitioner. Its very object, however, is only half accomplished on account of the conflicting times of the two meetings. Of the more than 4800 members of the Society, probably 90 per cent are engaged in the general practice of medicine, and in consequence are interested in all lines of study that pertain to their general work. They are interested in what can be accomplished by a radiographic examination of the chest; what a chest plate of early tuberculosis looks like for instance. But he is also interested in the subject of eclampsia. He must decide whether he will attend the section meeting on Radiology or whether he will attend the one on Obstetrics and Gynecology. From the standpoint of education of the general practitioner, he should hear both. In order that our members may hear all of the many excellent papers on the program it will be necessary so to arrange the program that no section may conflict with any other. This is obviously not feasible, on the ground of expense and lack of room.

This then brings up the question of multiplicity of sections. Are there too many sections for the greatest good of the greatest number? In a society where 90 per cent of its members are interested in general medicine in all of its branches, do multiple section meetings and section programs furnish the greatest benefit to the members of the Society as a whole? Does not such a make-up of the program tend in a definite way to foster the custom which present-day medical education is designed to correct, viz., that medicine should get away from undue specialization? The contention has been offered that the formation of new sections should be encouraged at our annual meetings, since it gives an opportunity for those interested in the various special subjects to broaden their knowledge in these lines, without being obliged to hear many papers in which they are not so much interested. Is this after all the broadest manner in which this subject may be considered? Is it not possible that such segregation may show an increasing tendency to become narrower, more restricted, and more specialized in the subjects which are offered in the program? Does not the desire to form new sections tend to demonstrate this very feature? Is it not proper to ask, in all fairness to our membership, whether we should not take particular pains to provide a program that is likely to be of the most value to the general practitioner, and not to be directed to the specialist primarily? In all fairness to the sections in the past, I am sure that our officers have very definitely had this in mind from year to year and I only refer to it as one possibility. This very pertinent question may very well be considered when it is remembered that the pediatricians have their own New England Pediatric Association, the x-ray men have their own New England Radiographic Society, the obstetricians and gynecologists have their separate organization, known as the New England Association of Obstetrics and Gynecology, the surgeons have their New England Surgical Society, the genito-urinary men have their New England Branch of the American Urological Association and others of which I have incomplete knowledge. General medicine alone appears not to be represented, although it, too, has its New England Heart Association. It seems, therefore, that the general society is not depriving the specialist of any of his opportunities if the section programs could show less specialization and more general practical information for all. With these changes in the subjects on the program, could the meetings be general in their character, all to be held in the main meeting room, and the subjects sufficiently related to retain the continuous interest of the audience? In support of this suggestion I would refer to meetings of the Interstate Medical Association, considered to be one of the most popular and best attended medical meetings held in this country. Its programs are continuous from early morning until late in the evening and cover almost the entire field of medicine. I would dislike to see the programs of the Interstate Medical Association without its opportunity of discussion in any, substituted for the present program of our own Society where free discussion by all is rightly encouraged. Can we not, however, work out the general meeting idea which has made the meetings of the above-mentioned association so extremely popular? I am not unmindful of the very excellent work that has been carried out by the different sections, but it is my feeling that these excellent programs of the past have not been attended by such large audiences as the importance of the subject merits. A consideration of this suggestion by the officers of the different sections is in order.

The Department of Public Health, through its Commissioner, Dr. Bigelow, has asked the Massachusetts Medical Society to coöperate with it in the campaign through which it is undertaking to instruct the public in a better knowledge of the factors which influence the mortality of appendicitis. Enough studies have been carried out in different sections of our coun-

try to demonstrate very conclusively, that many of the complications of this disease have added very materially to the increasing death rate, and are directly related to neglect and to self-medication of abdominal pain by the patient. It has been demonstrated in Philadelphia that a better knowledge by the public regarding the early treatment of abdominal pain results directly in reducing the loss of time from appendicitis, together with a reduction in the mortality. I am sure that this Society is only too glad to coöperate in every possible way with the Department of Health in any measure which is likely to lessen the loss of time incident to any disease, and to lower the mortality incidence of any ailment. Let us all get behind this campaign of the Health Department of our State and do all that is possible to bring about better results.

The report submitted to the Council at yesterday's meeting, of the results so far accomplished by the Committee on Public Relations, is in reality a report of progress and it seems to me is most encouraging. The character of the work undertaken is necessarily slow of accomplishment and much time will be required to obtain even minor results, and it will be necessary in consequence, for the Society to exercise much patience with the Committee. The contacts which this Committee has made with the Industrial Accident Board and with representatives of the various insurance companies with whom the physicians of Massachusetts are more or less associated in their daily work, have shown a spirit of coöperation by all parties interested, which has been most gratifying. Instances are only too numerous where the doctor has failed to realize the benefits accruing from the Workman's Compensation Act, not only to the injured workman, but to the doctor and to the hospital as well. We must all realize that the cost of carrying out this Act has increased steadily from the time of its enactment in 1912, up to the present time, and in 1930, this increase in cost in less than 20 years, had amounted to more than 600%. It must be brought home to all of us in the most convincing manner, that the cost of carrying this compensation insurance has become so much of a burden upon the employer of labor, that an increasing number of employers are no longer availing themselves of the benefits of the Act, preferring, on account of the expense involved, to go back to the conditions that existed previous to 1912, and to take their chances at common law in case any of their employees become injured while at work. In the discussions which have been carried on by the Sub-Committee of the Public Relations Committee, with a committee from the insurance companies, it has, I think, been definitely brought home both to the insurance and the medical committees, that there is not so much conflict and opposition as is generally supposed. Both sides to this controversy are working for one subject, i.e., to have the injured employee cared for as efficiently and as reasonably as possible, and to get him back at work at the earliest possible time and in the best possible condition. There have been errors of judgment on both sides, and in order to arrive at some common ground, the complaints arising from both parties have been freely discussed, and it must be admitted, much as we dislike to do so, that there are many just reasons for complaint regarding the attitude of physicians to compensation cases. This should be corrected, and if we are to do our part in carrying out this beneficent act, we must fully understand these complaints and do our best to prevent their recurrence. We are criticized by insurance company adjusters under the Workman's Compensation Act, for not rendering full and prompt reports of the nature and treatment of the injury received by the injured workman, and for not keeping more complete records of the day-to-day service rendered these injured workmen, until the time of recovery. We are criticized for undue frequency of treatments and increased cost of service that is not borne out by the summary reports as to the character of the injury. Multiplicity of radiographs, unauthorized operative procedures, excessive charges for service rendered, are also criticisms offered by insurance adjusters under the Workman's Compensation Act. These criticisms are undoubtedly true in a limited number of cases, but sufficiently often to cause censure of the whole medical profession. In other words the sins of the few are borne by the many. The recommendations of the Committee from its studies, as so far carried on, are praiseworthy, and we as a profession should endeavor to further coöperate with insurance companies by being willing to render prompt and complete reports, maintaining more careful medical histories of these cases, and in urging better judgment on the part of the profession in its business and financial relations with these companies. The Committee on Public Relations is trying to evolve some suggestions governing our conduct in these cases which may clarify the situation somewhat and render our relations with the Industrial Accident Board, and with the insurance adjuster, somewhat more amicable, and thereby aid in the restoration of confidence in our sense of fairness and quality of service which we are to some extent losing through the acts of a few whom we have been unable to influence.

In the past six months the medical profession throughout the country has been more or less interested in the report of the Committee on the Costs of Medical Care. This report as all of you know, was issued on November 29, last, and was the final report of the result of five years of study by a large group interested in problems relating to illness in all of its phases, and particularly as it relates to illness among

the poorer classes. In our own State Society this report was considered for study by the Committee on Public Relations at its meeting in December last, soon after the report was issued. At that time it was felt by this Committee that the report had not been out sufficiently long for any crystallization of sentiment, either favoring or dissenting, from the recommendations of either the majority or minority reports of the Committee. At the same time one or two other matters were brought up for consideration and studied by this Committee, and one in particular seemed to be a more pressing problem as it concerned the Society and its members. In April of this year, this Committee again voted to consider this report as soon as its present task relating to the Workman's Compensation Act and its application to physicians was completed. Contrary to the belief of some of our members, there are many in our Society who strongly feel that some of the thoughts brought out in this report merit very careful study. Furthermore, there are many who believe that some effort should be made by us, as a Society, to map out in a general way, different ways and methods by which some of the recommendations in the report may be made acceptable to the majority of the membership of our State Society. They believe that certain plans and studies may be worked out after careful consideration, and that some of these may be applied in an experimental way to certain areas in our own State for demonstration. I have listened to discussions, both by members of the original Committee and by others interested in the report. I have also listened to many opinions expressed in man-to-man discussions of the subject. I am quite convinced that there is much misunderstanding regarding it. It seems to me that altogether too much attention has been paid to the literal recommendations brought forward by both the majority and the minority groups, and not enough to the many actual demands for better medical care for the wage earner which this report has brought to light. It also seems to me that not enough thought and consideration have been concentrated on the changing trend of public opinion regarding the relationship of the physician to present-day social and economic conditions.

In the public mind the physician has failed to increase his social and economic standing. He is bound by his own environment, and he fails fully to grasp what is slowly being demanded by the public regarding its medical care. In too many instances in the past the public has waited for some guidance in the solving of real public questions calling for wise medical leadership, and failing in this, it has finally worked out some plan of its own that was not at all satisfactory from a medical standpoint, but which when adopted, has called for service without professional leadership and the physician's particular part in the program has been more or less a minor one. What has happened in the past regarding these movements is not unlikely to happen in the future. Programs ostensibly for the betterment of the ill, will undoubtedly be promulgated by many organizations, some fostered by more or less socialistic agencies, some from a purely philanthropic motion, and some from the standpoint of commercial gain. A close study of what is taking place on the Pacific Coast among its so-called health agencies, health leagues and organized associations that have for their only object the selling of medical service to the public on a per capita basis presents illustrations. Under the conditions imposed in some of these organizations, the physician is bound to lose his personality and his professional standing in any community and he becomes, as has been so well said by one of our New England surgeons, "the hired man". No better illustration of the results of the public presentation of such a document as the Report of the Committee on the Costs of Medical Care can be given, than the rapid development in the past year of the various plans providing hospital care for a definite group, for a specified number of days, the so-called "Hospital Insurance" plan. These plans vary somewhat in structure and as a group they present many excellent features to be highly commended. Theoretically this appears to be a most desirable and simple method for the workman to provide himself with hospital care at the time of illness, a time when he is perhaps less able to care for a hospital bill. Nearly all of these plans however refer to hospitals and few, if any of them, contain any provision covering his medical expense other than hospital charges. In the consideration of these plans, should not the doctor work with the hospital in the attempt to bring about some form of insurance for the working man that should include both hospital and doctor, each to receive from this fund contributed by the working man, a reasonable remuneration for service? Cannot some plan be worked out whereby the physician as well as the hospital may receive compensation, the physician like the hospital perhaps limiting the amount of service to be contributed under the provisions of the plan? This is a movement which springs directly from the report of the Committee on the Costs of Medical Care. Is this not an excuse and a reason for a careful study of the report by the medical profession? There are many hospitals in our own State where all medical service rendered is restricted to a carefully selected staff, and physicians outside of this selected staff are not permitted to care for their private patients in such hospitals. This, the so-called "closed" hospital staff, has many advantages from the hospital and educational standpoint, and this type of administration must necessarily exist in the so-called "teaching" hospital. The other type of hos-

pital, the so-called "open" staff hospital allows any physician of good standing to care for patients within its walls. It seems to me that if the so-called Hospital Insurance Plan is to be carried out by large so-called "closed" staff hospitals only, the worker, whatever his standing in the industrial field, who contributes toward the maintenance of such hospital, finds that he no longer has the services of his family physician for whom he has a high regard. In many instances he would be obliged to accept the gratuitous service of a member of the staff of the hospital, toward the support of which, he has been contributing for some months or years. In other words, he has been the recipient of a certain amount of charity, completely so in fact, so far as his strictly medical service is concerned. Is this condition of affairs likely to improve the morale of the patient? What is likely to be the mental reaction on the part of his long-time physician who is denied the privileges of the particular hospital to the support of which his patient has been contributing? It seems to me that two things are likely to happen to a greater or less extent: first, that the hospital contributor will find that medical services can be secured without payment, although he is in a position to offer payment in a reasonable degree; secondly, it is not unlikely to create a considerable amount of personal animosity toward such hospitals by capable, reliable practitioners whose hospital connections are not included. Is not this physician likely to feel that so-called "State Medicine" has arrived, at least in substance if not in name. In his contacts with his patients is he not likely to exercise some persuasion looking toward prevention of hospital care of such patients, even though he fully realizes the full benefits of such care? Self-preservation is the first law of nature, and this inherent force will compel the physician to look after his living and his business in a way most advantageous to him. It seems to me there are but two ways to obviate this fault of the Hospital Insurance Plan. One is for all hospitals to adopt the general staff plan as it is carried out at the Buffalo General Hospital, whereby any reputable physician may care for his patient in any good hospital. The other is that the acceptance of the plan should be dependent upon its application to all good hospitals within a definite radius. An attempt is being made in our own State to develop a form of hospital insurance. This plan is now limited to a small group so far as I am able to learn. It is proposed by means of solicitation, to secure as large a number of monthly contributors as possible from the employee class. Under the rules and regulations of some of these hospitals, this contributor when he is admitted as a patient, will be cared for gratuitously by the particular physician on duty at this time. Whether he is financially able to pay a moderate fee for such care is not considered. He contributes the stipulated sum to the hospital fund and this entitles him to its benefits. I think it is quite pertinent to ask how long the so-called "family physician" is likely to last under these circumstances.

These are but illustrations of many problems along similar lines that are sure to arise in the future. It is because these problems are bound to come up that I feel so strongly that physicians as a whole should enter more actively into the study and discussion of social and economic questions; that they should be leading and not guiding public opinion, and that they should act in a rational broad-minded way. Unless physicians as a group are willing to become more active along these lines, it is not unlikely that they will find themselves led into many schemes, for which they are totally unprepared, and many plans which are distinctly opposed to their best interests, and also against the best interests of the public as well. Again I say that it is my firm conviction that it is to the trend of public opinion and to certain conditions brought out in this report on the Costs of Medical Care, which the physician should most carefully consider, and that the recommendations by the Committee are but guideposts of what may be done. It seems to me that those directly interested in the treatment of disease should get together in a whole-hearted, broad-minded way and try to work out plans which will give to the public the character of medical service which they wish and which they need, and at the same time will enable us as physicians, to continue to maintain our livelihood. Each group of physicians in every community should get together and frankly ask the question: Are conditions in this community what they should be? Can we as physicians do anything to improve such conditions? The questions should be asked honestly and answered sincerely.

In concluding this rather lengthy address, I desire to pay tribute to the unqualified and whole-hearted support of the officers and committees who have to do with the administrative duties of the Society. I have in all instances found them most willing to coöperate, progressive in their ideas and gifted with unusual judgment in carrying out the particular functions and duties of their office. I desire at this time to express to them in a most sincere way, my hearty appreciation of this spirit of coöperation and helpfulness, and to assure them and you that whatever success may have been attained by my service in office in your behalf, has been largely due to their helpfulness and their aid. I also wish to express to the Society as a whole my appreciation of the opportunity for service which the position of President of the Massachusetts Medical Society has given to me and to assure you that no one can occupy this position without increasing his respect and admiration for the profession of which he is a part.

ARTERIOSCLEROSIS AND DIABETES MELLITUS*

BY EARL R. LEHNHERR, M.D.‡

THE frequency of arteriosclerosis as a complication of diabetes mellitus has been commented upon by most students of the disease since the latter part of the nineteenth century. If arteriosclerosis among diabetic patients was important before the discovery of insulin, it is more important now. The use of insulin has prolonged the life of the diabetic patient[1] so that rapid diabetes[2, 3] is rare and he lives more in the arteriosclerotic zone than ever before. However, Leutenegger[4] believes there is no definitely characteristic diabetic arteriosclerosis.

Chemical analyses of 25 diabetic aortae, 25 non-diabetic aortae, and six children's aortae were undertaken to obtain information regarding the deposition of lipids (fats) and their subsequent calcification, and to determine any chemical peculiarity which might exist in the diabetic vessels.

The analyses for the alcohol-soluble lipids and the acid-soluble calcium and phosphorus content† of whole aortae are given in tables 1, 2, and 3. The pathological description of the aortae was obtained from the autopsy report. Some variation in descriptions according to the individual operators was inevitable, but the results are in general agreement as to the differences between the diabetic and the non-diabetic aortae.

In the non-diabetic patients the frequency of carcinoma as a cause of death was due to the fact that those patients were nearly all from the Palmer Memorial Branch of the New England Deaconess Hospital, or from the House of the Good Samaritan. Nearly all of the diabetic patients were from the New England Deaconess Hospital. The sex distribution in the two groups was reversed. Among the diabetics, 13 of the 25 were males and among the non-diabetics only eight were males. The average age of the diabetic patient at the time of death was 57 years as compared with 51 years for the non-diabetic patient. In the diabetic group the causes of death were directly related to the arteriosclerosis in 13 cases.

Hypertension existed to some degree in each adult and was probably associated with the vascular pathology at the time of death. There was no evidence of chronic nephritis, and only one case (Diabetic No. 25) had a history of syphilis.

The children's aortae were obtained through the courtesy of Dr. R. Z. Schulz of the Children's Hospital. The amount of tissue available from these aortae was so small that several were pooled (see table 3) in order to obtain values for calcium and phosphorus.

Effect of arteriosclerosis on the chemical findings in aortae: In table 4 the average values for the children's aortae, smooth adult aortae, non-diabetic aortae with pathology, and the diabetic aortae with pathology are listed. Examination of this table shows that the presence of arteriosclerosis in the aortae is associated with

(1) Increased amounts of each lipid.
(2) Changes in the lipid allocation.
    (a) Increased proportion of the total lipid as cholesterol.
    (b) Diminished proportion of the total lipid as fatty acid and as phospholipid.
(3) Increased amounts of acid-soluble calcium and phosphorus.
(4) Diminished calcium-phosphorus ratio.
(5) Diabetic aortae show similar changes, but to an exaggerated degree.

Atheromatosis, i.e., lipid deposition into the intimal structure, and atherosclerosis (atheromatosis complicated by connective tissue overgrowth) from a chemical point of view appear to be similar in the diabetic and the non-diabetic aortae; but there is a greater deposit of lipid, a more marked change in the lipid allocation, and a higher calcium and phosphorus content in the diabetic aortae. Calcium and phosphorus were detected in all adult aortae, the former usually in the larger amount, and it was striking to find these two elements in as high a concentration as 21 per cent and 9.86 per cent respectively, i.e., nearly one third of the lipid free material in the diabetic aorta No. 14 was due to these two elements.

The effect of age upon the chemical changes in the aortae: In table 5 the results are given according to the age of the patient at the time of his death. They have been grouped as non-diabetic children, diabetic children, adults under 50 years of age, adults from 50-60 years of age, and adults over 60 years of age.

*From the Laboratory of the New England Deaconess Hospital.

This work was made possible by a grant from the Chemical Foundation.

†The dried and powdered aortal tissue (intimal and medial layers from formalin preserved aortae) was extracted successively by repeated portions of boiling alcohol, and with an excess of twenty per cent trichloracetic acid. The total cholesterol and the total lipid were determined according to Bloor's procedures[2]. The alcohol soluble phosphorus, calculated as phospholipid, was determined by a micro-method suggested by Fiske and Subbarow (personal communication). We did not determine the residual lipid associated with the protein not extractable with hot alcohol. The calcium and the phosphorus were determined in the trichloracetic acid filtrate. The acid soluble calcium and phosphorus in a series of aortae before and after the formalin and alcohol treatment differed on an average of 3.4 per cent and 3.4 per cent respectively. These differences are slight if we consider the difficulty in obtaining representative portions from a pathological aorta, and we believe that the results here reported are comparative.

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TABLE 3

CHEMICAL ANALYSES OF NON-DIABETIC CHILDREN'S AORTAE

Age in Years	Cholesterol Grams Per Cent	Fatty Acid Grams Per Cent	Phospholipid Grams Per Cent	Total Lipid Grams Per Cent	Per Cent Total Lipid: Cholesterol	Per Cent Total Lipid: Fatty Acid	Per Cent Total Lipid: Phospholipid	Calcium Grams Per Cent	Phosphorus Grams Per Cent	Cause of Death
0.3	0.5	1.5	—	1.7	29.4	—	—	—	—	Mesenteric thrombosis
0.9	0.3	1.6	0.69	1.99	15.0	60.8	24.2	—	0.05	Erysipelas
1.8	0.4	2.6	—	3.0	13.3	—	—	—	—	Nephritis
6.0	0.7	1.2	—	1.94	35.0	—	—	0.0	—	Pneumonia
Pooled	0.5	1.6	0.7	2.1	23.8	43.1	33.1	0.08	0.02	———
Pooled	1.0	—	—	—	—	—	—	0.27	less than 0.006	———

TABLE 4

COMPARISON OF CHEMICAL FINDINGS IN NON-DIABETIC AND DIABETIC AORTAE WITH AND WITHOUT GROSS PATHOLOGY

	Number of Aortae	Age in Years	Cholesterol Grams Per Cent	Fatty Acid Grams Per Cent	Phospholipid Grams Per Cent	Total Lipid Grams Per Cent	Per Cent Total Lipid: Cholesterol	Per Cent Total Lipid: Fatty Acid	Per Cent Total Lipid: Phospholipid	Calcium Grams %	Phosphorus Grams %	Ca/P
Aortae of children												
Non-diabetic	6	2.2	0.5	1.6	0.81	2.1	23.2	58.9	38.5	0.00	0.05	—
Diabetic	2	15.5	1.2	2.3	—	3.5	37.0	—	—	0.14	0.02	7.0
Smooth adult aortae*	9	46.0	2.5	3.1	1.35	5.6	42.6	34.2	23.7	0.74	0.37	2.0
Adult aortae with gross pathology												
Non-diabetic	17	57.0	4.8	4.6	1.72	9.4	47.6	33.6	18.3	1.57	1.11	1.4
Diabetic	22	58.0	7.8	5.6	2.4	13.4	53.7	26.2	17.9	4.7	1.9	2.9

*The smooth adult aortae represents the average value of eight non-diabetic and one diabetic aortae.

TABLE 5

COMPARISON OF DIABETIC AND NON-DIABETIC AORTAE ACCORDING TO THE AGE AT TIME OF DEATH

	Number of Aortae	Average Age in Years	Cholesterol Grams Per Cent	Fatty Acid Grams Per Cent	Phospholipid Grams Per Cent	Total Lipid Grams Per Cent	Per Cent Total Lipid as: Cholesterol	Per Cent Total Lipid as: Fatty Acid	Per Cent Total Lipid as: Phospholipid	Calcium Grams Per Cent	Phosphorus Grams Per Cent	Ca/P
Children's aortae	6	2.2	0.5	1.6	0.81	2.1	23.2	38.3	38.5	0.00	0.05	—
Diabetic children's aortae	2	15.5	1.2	2.3	—	3.5	37.0	—	—	0.14	0.02	7.0
Non-diabetic aortae	8	32	2.8	3.3	1.9	6.1	40.8	31.6	27.1	0.59	0.29	2.0
Diabetic aortae*	3	40	3.0	4.3	2.9	7.3	40.8	35.7	23.4	0.63	0.38	1.6
Non-diabetic aortae	9	58	4.2	4.7	2.0	8.9	45.1	29.9	18.3	1.18	0.46	2.6
Diabetic aortae	6	56	6.2	4.1	2.4	10.4	50.4	30.8	15.7	3.63	1.52	2.4
Non-diabetic aortae	7	67	5.6	4.5	2.2	10.2	52.5	28.7	16.3	2.44	1.89	1.3
Diabetic aortae†	10	69	9.4	6.5	3.3	15.8	57.7	28.5	13.5	7.48	2.89	2.59

*1 additional aorta without analyses for calcium and phosphorus.
†3 additional aortae without analyses for calcium and phosphorus.
NOTE: The additional aortae values, if included, would not change the ultimate comparison.

Comparison of the data shows changes in the lipid content, lipid allocation, and calcium and phosphorus values which are in general agreement with the increase in atheromatosis and atherosclerosis known to occur with advancing age[3, 7, 8]. Both the diabetic and the non-diabetic aortae have increasing amounts of each lipid, increasing proportion of the total lipid as cholesterol, and increasing amounts of calcium and phosphorus associated with the older ages. The diabetic aortae differ, as was shown in table 4, in the exaggeration of the process. This difference was most marked in the group from 50 to 60 years of age in which the average value for each

CHEMICAL ANALYSES

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No.	Autopsy Number	Sex	Age in Years	Cholesterol Grams Per Cent	Fatty Acids Grams Per Cent	Phospholipid Grams Per Cent	Total Lipid Grams Per Cent	Per Cent Total Lipid as Cholesterol	Fatty Acids	Phospholipid	Calci Gra Pe Ce
1	3766	M	40	2.4	3.1	1.9	5.5	43.6	32.8	24.2	0.
2	3768	F	40	1.8	2.4	4.2	4.2	42.8	32.8	25.0	0.
3	4263	M	40	2.2	2.3	1.8	4.5	28.8	43.2	28.0	0.
4	4108	F	41	3.2	4.0	1.2	7.2	44.5	43.8	11.7	0.
5	4443	F	42	2.5	2.7	2.2	5.2	48.1	22.3	29.6	0.
6	4833	F	46	2.2	5.0	2.1	7.2	29.6	50.0	20.4	0.
7	4426	F	48	1.1	3.3	1.8	4.4	25.0	46.4	28.6	0.
8	4487	M	49	7.2	5.0	3.3	12.2	59.0	22.0	19.0	0.
		Smooth area =		2.2	2.6	1.7	4.8	46.0	29.2	24.8	0.
9	4702	F	50	2.2	2.8	0.9	5.0	44.0	43.0	13.0	1.
10	4966	F	51	1.9	3.3	1.0	4.2	45.2	28.2	26.6	0.
	Areas including vertebral arteries =			2.5	3.3	2.3	6.0	41.7	31.5	26.8	0.
11	4016	F	51	2.4	2.6	1.5	5.0	28.0	46.0	26.0	1.
12	4990	F	54	2.6	2.7	2.5	5.3	49.0	18.0	33.0	1.
13	4930	M	55	4.1	4.7	1.9	8.8	46.6	38.3	15.1	2.
14	4280	F	57	3.9	5.0	—	8.9	43.8	—	—	0.
		Calcified areas =		3.8	12.5	—	16.3	25.3	—	—	3.
15	5088	F	58	9.8	6.7	3.0	16.3	60.0	27.1	12.9	0.
16	4864	F	58	4.4	4.4	1.6	8.8	50.0	37.3	12.7	0.
17	4315	F	59	3.0	3.4	—	6.4	46.8	—	—	0.
18	4538	F	62	4.1	4.0	2.9	8.1	50.6	24.4	25.0	1.
19	4834	M	63	2.7	5.5	—	8.2	33.0	—	—	0.
20	4143	F	63	9.2	3.5	2.6	12.7	72.0	13.7	14.3	4.
21	4725	M	63	9.0	7.7	2.9	16.7	53.9	34.0	12.1	2.
22	5132	M	66	6.1	5.3	1.1	11.4	53.5	39.7	6.8	2.
		Smooth areas =		2.4	2.8	2.0	5.7	46.2	29.2	24.6	—
23	5505	M	71	9.4	4.2	2.2	13.6	69.9	19.6	11.3	3.
24	3767	F	75	2.3	3.0	1.4	5.3	43.4	40.0	16.6	0.
25				7.4	7.0	3.0	14.4	51.3	34.1	14.6	1.

TABLE 2

OF 25 NON-DIABETIC AORTAE

DER OF AGE AT TIME OF DEATH

ium ms er nt	Phos-phorus Grams Per Cent	Calcium / Phos-phorus	Pathological Findings: Aortae	Pathological Findings: General
14	0.08	1.7	Smooth and elastic.	Pulmonary embolism.
55	0.21	2.6	Some fibrous thickening and early calcification.	Cystadenoma of ovary.
30	0.34	2.3	Slight fibrosis.	Melanotic sarcoma.
98	0.46	2.1	Aorta "negative."	Carcinoma of face, meningitis.
41	0.92	0.44	Slight fibrosis.	Carcinoma of colon.
96	0.37	2.6	Irregular fibrous change.	Carcinoma of uterus.
57	0.05	13.4	Soft and elastic.	Carcinoma of rectum.
39	0.63	1.4	Smooth and elastic.	Carcinoma of penis, lobar pneumonia.
27	0.35	0.8		
17	0.36	3.5	Smooth and elastic.	Carcinoma of stomach, peritonitis.
96	0.48	2.0	Some fibrous thickening and fatty change.	Carcinoma of cervix.
38	0.38	2.3		
90	0.61	1.6	Some fibrous thickening, fatty change and calcification.	Carcinoma of lung.
6	0.50	2.3	Smooth and elastic.	Postoperative hemorrhage, hyperthyroid, gallstones.
5	1.13	2.3	Slight thickening, diffuse calcification.	Pulmonary emboli, carcinoma of rectum.
3	0.50	1.0	Some fibrous thickening.	Carcinoma of breast.
2	0.33	10.0		
2	0.39	1.3	Some thickening, with small, soft, partly calcified plaques.	Carcinoma of ovary, old cholecystectomy.
1	0.36	2.0	Irregular fibrous thickening, diffuse calcification.	Epidermoid carcinoma of vulva.
0	0.33	2.7	Some thickening and calcification.	Carcinoma of breast.
3	0.66	2.2	Smooth and elastic.	Lymphatic leukemia.
1	0.39	2.1	Some fibrous thickening.	Carcinoma of cecum, peritonitis.
	2.38	1.75	Some thickening and fatty change.	Carcinoma of kidney (hypernephroma).
	2.1	1.3	Advanced arteriosclerosis, heavily calcified.	Carcinoma of rectum, peritonitis.
7	2.32	1.1	Some fibrous thickening, with small, softened, partly calcified plaques.	Lobar pneumonia.
—	—	—		
6	7.00	0.5	Few large atheromatous plaques with moderate degree of calcification.	Hemachromatosis, carcinoma of liver.
2	0.43	2.1	Some fibrous thickening.	Osteitis deformans. Bronchopneumonia.
3	0.86	2.2	No record available.	No record available.

of the various lipids, the lipid allocation, and the calcium content is actually greater than the corresponding values in the non-diabetic group ten years older. The diabetic group with an average age of 32 to 40 years shows no definite difference from the non-diabetic aortae.

In other words, if the age of the patient was reckoned by the amount of lipid and calcium deposited in his aorta, and presumably in his other arteries, the diabetic patient in middle life would be prematurely aged.

Relation of the cholesterol content of the aortae to the amount of calcification: In tables 4 and 5 the relationship of calcification to the amount of lipid deposited is readily seen. The increased cholesterol deposits, related to the amount of arteriosclerosis and the age of the individual at the time of his death, is accompanied by increased amounts of calcium and phosphorus. This is shown to advantage in table 6 in which the amount of calcium and phosphorus in the aortae is compared with the cholesterol content.

The increasing cholesterol content of the aortae is accompanied by an increase in the proportion of the total lipid as cholesterol which is nearly identical for the diabetic and the non-diabetic aortae. The largest amounts of calcium and phosphorus were found with a moderate deposition of cholesterol. The differences in the diabetic and the non-diabetic aortae are in the exaggeration of the calcium and the phosphorus deposits in the diabetic aortae.

The change in the character of the various components in the diabetic aortae is not in the lipid allocation or in the amount of lipid deposit, but in the increased calcification which accompanies the usual process. This is indicated by the higher calcium and phosphorus deposits found in the diabetic vessels.

Relation of the duration of diabetes mellitus to aortal deposit: The grouping in table 1 has been made purposely in the order of the known duration of the diabetes. In table 7 are grouped the analyses of eight diabetic aortae from patients having a history of diabetes from six months to thirty-five years. These latter cases were selected because the cause of death has been related to their vascular condition in each instance and was not associated with pathological findings which might complicate the interpretation.

Most of the patients happen to fall into that age period when some calcification of the aorta might be expected even in non-diabetics. The best cases for testing the effect of long duration of diabetes would be cases dying in middle life, of whom almost none were found. Case No. 23 died at 55 years after having diabetes 11 years. The aorta showed marked calcification and it contained 13.8 per cent calcium. Yet in certain cases the aorta contained little calcium when analyzed in spite of the gross appearance of its presence as in Case No. 25. However, in the

TABLE 6

COMPARISON OF DIABETIC AND NON-DIABETIC AORTAE ACCORDING TO THE CHOLESTEROL CONTENT

	Per Cent Total Lipid as Cholesterol		Calcium Grams Per Cent		Phosphorus Grams Per Cent	
	Diabetic	Non-Diabetic	Diabetic	Non-Diabetic	Diabetic	Non-Diabetic
Small amounts of cholesterol	41.5	40.6	0.89	1.06	0.47	0.44
Moderate amounts of cholesterol	55.0	58.8	7.52	2.46	3.36	2.17
Large amounts of cholesterol	60.4	58.5	5.72	0.34	2.42	0.19

TABLE 7

THE RELATIONSHIP OF THE DURATION OF DIABETES AND AORTAL DEPOSIT

Age in Years	Known Duration Diabetes in Years	Cholesterol Grams Per Cent	Total Lipid Grams Per Cent	Per Cent Total Lipid as Cholesterol	Per Cent Total Lipid as Phospholipid	Calcium Grams Per Cent	Phosphorus Grams Per Cent	General Pathology
75	0.6	20.4	38.6	52.8	18.6	3.18	1.34	Generalized arteriosclerosis, gangrene
61	1.5	7.3	10.4	69.5	—	16.3	6.68	Coronary thrombosis, gangrene hemochromatosis
67	2.1	14.0	20.8	67.3	10.7	6.5	3.35	Generalized arteriosclerosis
69	3.1	7.0	11.7	40.1	6.6	21.0	9.68	Generalized arteriosclerosis
69	6.0	7.4	13.4	55.0	13.5	4.5	2.28	Chronic vascular myocarditis
56	10.0	4.4	9.3	49.5	18.8	1.9	0.67	Coronary thrombosis
55	11.0	6.7	9.3	72.0	11.3	13.8	6.1	Infarct of heart
66	35.0	9.7	15.7	61.8	14.7	0.83	0.37	Pulmonary embolism

TABLE

CHEMICAL ANALYSES OF 25

IN THE ORDER OF THE KNOWN DURA

No.	Autopsy Number	Sex	Age in Years	Known Duration of Diabetes in Years	Cholesterol Grams Per Cent	Fatty Acids Grams Per Cent	Phospholipids Grams Per Cent	Total Lipid Grams Per Cent	Per Cent Total Lipid as Cholesterol	Per Cent Total Lipid as Fatty Acids	Per Cent Total Lipid as Phospholipid	Calcium Grams Per Cent
1	3747	M	58	0.1	9.3	6.1	2.4	15.4	60.3	28.9	10.8	0.80
2	9978	F	43	0.1	4.7	6.2	3.2	10.9	43.2	36.2	20.6	1.26
3	251	M	57	0.1	2.4	3.4	2.0	5.8	41.4	34.6	24.0	0.70
4	4565	F	72	0.2	13.5	7.8	4.2	21.3	63.4	22.8	13.8	2.66
			Abdominal portion =		13.2	10.8	2.7	23.6	55.8	36.2	8.0	10.1
5	10774	F	53	0.2	7.1	6.5	4.1	13.6	52.2	26.7	21.1	1.26
6	10754	M	75	0.6	20.4	18.6	10.3	38.6	52.8	28.6	18.6	3.18
7	3709	M	75	1.0	8.9	5.6	1.8	14.5	61.8	29.5	8.7	—
8	5142	M	61	1.5	7.3	3.2	—	10.4	69.5	—	—	16.3
9	10564	F	17	2.0	1.7	3.3	1.3	5.0	34.0	47.8	18.2	0.10
10	4606	F	67	2.1	14.0	6.8	3.2	20.8	67.3	22.0	10.7	6.5
11	3515	F	48	3.0	2.2	3.3	—	5.5	40.0	—	—	0.30
12	5325	F	69	3.0	3.0	4.1	2.4	7.1	42.3	34.0	23.7	1.81
13	5469	M	31	3.1	2.2	3.4	2.7	5.6	39.3	27.0	33.7	0.23
14	3928	F	69	3.1	7.0	4.7	1.1	11.7	40.1	53.3	6.6	21.0
15	4294	M	48	4.0	5.1	4.5	2.9	9.6	53.2	27.1	19.7	—
16	3589	M	73	4.0	6.7	6.9	1.8	13.6	49.3	41.4	9.3	—
17	3842	F	62	4.4	11.0	7.4	2.6	18.4	60.0	30.1	9.9	—
18	10281	F	69	6.0	7.4	6.0	2.6	13.4	55.0	31.5	13.5	4.5
19	10392	M	14	8.0	0.8	1.2	—	2.0	40.0	—	—	0.19
20	3831	M	57	8.8	10.0	4.1	2.9	14.1	29.2	56.3	14.5	1.67
			Smooth area =		2.1	2.3	1.9	4.4	47.7	22.1	30.2	1.56
21	5153	F	56	10.0	4.4	4.9	2.5	9.3	49.5	31.7	18.8	1.9
22	4319	M	60	10.8	7.2	3.0	3.2	10.2	70.6	7.5	21.9	—
23	9919	F	55	11.0	6.7	2.6	1.5	9.3	72.0	16.7	11.3	13.8
24	4996	M	76	29.5	11.0	6.3	2.8	17.3	63.6	20.2	16.2	6.18
25	3804	M	66	35.0	9.7	6.0	3.3	15.7	61.8	23.5	14.7	0.83

DIABETIC AORTAE

TION OF DIABETES MELLITUS

Phosphorus Grams Per Cent	Calcium / Phosphorus	Pathological Findings: Aorta	Pathological Findings: General
0.33	2.4	Numerous softened plaques with calcification.	Congenital cystic kidneys, gallstones, cellulitis.
0.67	1.9	Numerous atheromatous plaques with beginning calcification.	Acute tubular nephritis, amyloid kidneys.
0.36	1.9	Little sclerosis, no calcification, no ulceration.	Typhoid fever, gallstones.
0.85	3.1	Numerous atheromatous plaques, some ulcerated.	Peritonitis, gallstones.
4.31	2.3		
0.64	1.9	Sclerotic changes throughout aorta.	Sepsis.
1.34	2.4	Extreme arteriosclerosis, marked destruction of intima, deep ulceration.	Generalized arteriosclerosis, gangrene.
—	—	Irregular areas of thickening, fatty change, and fibroses.	Multiple abscesses.
6.68	2.4	Marked atheromatous deposits and calcification throughout. Generalized arteriosclerosis.	Coronary thrombosis, gangrene, generalized arteriosclerosis. Hemochromatosis.
0.02	5.0	Numerous raised areas.	Diabetic coma, bronchopneumonia.
3.35	1.9	Thickening and numerous calcified areas throughout.	Cerebral hemorrhage, generalized arteriosclerosis.
0.14	2.1	Numerous areas of fatty change and calcification.	Carcinoma of gallbladder, gallstones.
1.41	1.3	Numerous atheromatous and calcified plaques.	Pulmonary embolism, gallstones, adenocarcinoma of uterus.
0.08	2.9	Scattered superficial atheromatous plaques.	Purpura hemorrhagica, intestinal obstruction.
9.68	2.2	Marked calcification, lower portion rigid.	Arteriosclerotic necrosis of brain.
—	—	Scattered atheromatous and calcified plaques, fibrosis.	Streptococcus septicemia, gallstones.
—	—	Moderate thickening and fatty changes, scattered atheromatous and calcified plaques.	Cerebral hemorrhage, gallstones.
—	—	Areas of fatty degeneration and numerous calcified plaques with scattered areas of ulceration.	Myocarditis, peritonitis.
22.8	2.0	Numerous foci of atheromatous change, calcification diffuse.	Chronic vascular myocarditis, bronchopneumonia, gallstones.
0.02	9.5	Early foci of fatty deposit.	Pulmonary tuberculosis, miliary tuberculosis, bronchopneumonia.
0.82	2.0	Some thickened, fatty changes and areas of fibrosis, calcification.	Gangrene of leg, gallstones, abscess of spleen, peritonitis.
0.87	1.8		
0.67	2.8	Moderate amount of atheromatous changes, some calcification.	Coronary thrombosis, gallstones.
—	—	Scattered atheromatous plaques.	Cerebral hemorrhage, gallstones.
6.1	2.2	Few ulcers and numerous foci of calcification.	Infarct of heart, gallstones.
2.26	2.7	Numerous thick atheromatous plaques, some ulcerated. Calcification practically absent.	Infarct of heart, pulmonary tuberculosis, gangrene, gallstones.
0.37	2.2	Extreme calcification and ulceration.	Pulmonary embolism.

latter case there was a history of syphilis dating back over a period of 17 years. His diabetes was extremely mild and was always under excellent control.

Relationship of the severity of diabetes mellitus and aortal deposit: The relationship of the severity of diabetes to the aortal deposit is shown in Diabetic Aortae Nos. 9 and 19. These are listed in table 8. These two children were 14 and 17 years of age. The child of 14 years had been admitted to the Children's Hospital eight years previously in coma. Since that time, he had not kept to his diet or maintained insulin supervision satisfactorily. He was admitted to the Deaconess Hospital because of impending coma. He was markedly dehydrated and had evidence of advanced pulmonary tuberculosis and generalized miliary tuberculosis. The blood sugar varied from 200 to 300 milligrams per cent during his stay in the ward. Autopsy confirmed the clinical diagnosis and showed early fatty deposit in the aorta and fatty infiltration of the liver. The second child was admitted to the Deaconess Hospital in diabetic coma. Two years previously her father, a diabetic patient under treatment, had discovered sugar in her urine but had not placed the child under medical supervision. The blood sugar on admission was 1000 milligrams per cent. The plasma contained 864 milligrams per cent of lipid of which 270 milligrams was cholesterol. Death occurred within twenty-four hours of admittance. At autopsy a perfectly smooth aorta with some lipid deposit was found. Acute glomerular nephritis, bronchopneumonia, and marked parenchymatous degeneration of the liver were also present.

The difference between these two diabetic children seemed to be in the known duration of their diabetes, eight years in the first case and two years in the second. The history and the blood findings in these two children may be interpreted as showing that the diabetes was more acute in the second patient (blood sugar 1000 milligrams per cent) whose aorta contained more cholesterol and total lipid, but less calcium than the other aorta. However, it is possible that the tuberculosis may have played a part in the general make-up of the first case.

Thus in these two children with severe diabetes, the one with the longest duration of diabetes mellitus has the more calcification, but less lipid deposition, than was found in the aorta of the patient dying in coma.

Discussion

From the foregoing data it is possible to formulate an explanation for the chemical changes occurring with the deposition of lipid in the aortal wall and its subsequent calcification which may explain the changes found in both the diabetic and the non-diabetic aortae. The difference in the two processes appears to be in the exaggeration of the process in the diabetic aortae.

A preliminary condition must be produced in the intimal structure in order to allow the deposition of the lipids. This process of atheromatosis, if the views of Aschoff[7] and Klotz[8] are adhered to, is the same in general character for all ages. The atheromatous lesions in early life may retrogress and disappear. In later life there is an overgrowth of connective tissue, atherosclerosis, which eventually cuts off the circulation to that area and localized tissue death and autolysis of the lipids occur. Calcium is readily available by diffusion from the blood stream for combination with the free fatty acids formed by autolysis of the lipids and the insoluble soaps are formed. These soaps slowly decompose leaving the calcium bound by carbonate and phosphate and the sodium soaps are dissolved away. If hyalinization of the protein occurs, it is possible for the degenerated substances to form combinations with calcium. A similar explanation for the calcification of lipid deposits has been suggested by other authors[7, 8, 9].

The cause of the increased permeability of the intimal structure is not known. A toxic action, i.e., a poorly understood physicochemical phenomenon, due to infection or to an unknown

TABLE 8

Comparison of the Severity of Diabetes and the Amount of Aortal Deposit

Age in Years	Known Duration Diabetes	Cholesterol Grams Per Cent	Total Lipid Grams Per Cent	Per Cent Total Lipid as Cholesterol	Per Cent Total Lipid as Phospholipid	Calcium Grams Per Cent	Phosphorus Grams Per Cent	Remarks
14	8.0	0.8	2.0	40.0	—	0.19	0.02	Poorly supervised diabetes. Death due to pulmonary and miliary tuberculosis.
17	2.0	1.7	5.0	34.0	18.2	0.10	0.02	Severe uncontrolled diabetes. Diabetic coma.

cause is the usual explanation[7, 8, 10, 11, 12]. Imbibition is a term which has been introduced in order to explain the deposition of the lipids[7]. We cannot deny that imbibition may occur but in a strict sense imbibition is associated with the swelling and the retention of a substance and results in a homogeneous combination such as the familiar swelling of gelatin when placed in water. The swelling of the intima is undoubtedly in part due to imbibition and it may explain the hyalinization of the protein, but atherosclerosis goes farther for there is a deposition of lipid, connective tissue proliferation, autolysis of lipids, and calcification. The use of imbibition as a term to explain atherosclerosis seems inadequate to explain the whole process and should be restricted to describe a possible phase in the formation of the lesion.

The factors responsible for the causation of arteriosclerosis are not satisfactorily known,[1, 2, 4, 8, 12, 13, 14]. However, these unknown factors seem to produce qualitative, though not quantitative, similar chemical changes in the aortal tissue of both diabetic and non-diabetic patients. Therefore, in order to explain the increased calcification occurring in the diabetic aortae, it is necessary to consider the conditions which are peculiar in the diabetic patient. It is customary to think first of the changes in the chemical composition of the body fluids, notably of the blood and urine, characteristic of diabetes mellitus. Thus, hyperglycemia, lipoidemia, ketonemia, and the diminished carbon dioxide content of the plasma during periods of acidosis have been regarded as possible etiological factors. Fundamentally, however, changes in the tissue cells may occur independently of the alteration in the fluids, at present not demonstrable, as a direct effect of the disorder.

Labbe[10] has said "the blood carrying an excessive quantity of glucose is a source of constant irritation to the tunica intima of the artery; this brings about a thickening and an attenuated inflammatory reaction of the blood vessel wall. . . ." Macleod[15] was unable to demonstrate in two experimental dogs "signs of arterial disease or of any other degenerative changes, although, owing to the sugar that was given, hyperglycemia and glycosuria were persistently present during the four years. This would seem to contradict the view . . . that the arteriosclerosis, the cataract, and the gangrene and other degenerative changes, so commonly observed in long-standing cases of diabetes in man, are an effect of the excess of sugar in the body fluids." It is possible that the high blood sugar may merely be an easily determinable index of the acuteness of the condition and not the direct cause of the exaggerated calcification which takes place in the diabetic vessels.

A high plasma lipid content forms a good medium from which lipid deposit may occur and pathological observations[7, 18, 16] indicate that the lesions in the intima are in part due to its deposition. The high plasma lipid content of the diabetic patients should make the formation of atheromatous lesions easier *provided the etiological agents for initiating physico-chemical changes in the intima which predispose to lipid deposition are present too.* That hypercholesterolemia is not the only factor in atherosclerosis is indicated by the repeated failure to reproduce that lesion in carnivora with diets rich in cholesterol[16, 17, 18, 19, 20].

A possible factor in the production of atheromatosis may be related to the identity and properties of the different lipids carried in the plasma. Thus not only should the total amount of plasma lipids be considered in this relationship but also the changes in the lipid allocation which occur with the abnormal lipid metabolism. In untreated diabetes there is an absolute increase in each of the plasma lipids associated with a relative decrease in the proportion of the total lipid as phospholipid. The saturation of the fatty acids is increased too. Following treatment with insulin and proper diet, the plasma lipids return to normal, the relative amount of total lipid as phospholipid increases, although the absolute amount of phospholipid is decreased and the saturation of the fatty acids becomes less.* These findings are in general agreement with the changes found in the lipid studies of Bloor[21] made on the developing and the degenerating corpus luteum of the sow.

The occurrence of an abnormal amount of keto-acids during acidosis is due to a metabolic disturbance in the burning of the fatty acids. The relation of these compounds to changes in the intima have been studied by Loeb[22]. He, working with hutch rabbits, found that aliphatic aldehydes, especially lactic acid, caused the destruction of the intima with great regularity. He apparently overcame the objection to the use of rabbits for producing experimental arteriosclerosis because of spontaneous changes[2, 3, 17] for during an eight-year period he examined a series of 483 control rabbits without finding a single instance of arteriosclerosis. He has been able to produce arteriosclerosis in dogs with lactic acid. He suggested that the increased incidence of arteriosclerosis in diabetes mellitus may be a result of the end products of a faulty lipid metabolism belonging to this group.

Howland[23, 24] has studied the process of calcification. He explained the deposition of calcium as being due to changes in the carbon-dioxide tension of the plasma which is directly related to the solubility of the calcium-phosphate. In the diabetic individual the presence of keto-acids would tend to lower the carbon-dioxide tension of the plasma and make the calcium more easily deposited. The early deposits of calcium

*Unpublished data.

in diabetic vessels have been demonstrated repeatedly by x-ray pictures[25, 26, 27].

High fat diets may bear some relationship to lipid deposits in the vessels[28] because of their apparent relation to a high plasma lipid content[29, 30] and their greater tendency to ketogenesis[31, 32, 33]. That the diet is not the only factor regulating the plasma lipid is indicated by recent observations of severe liver damage[34]. In one case the plasma lipid rose from a value of 366 milligrams per cent (total cholesterol 118 mg. per cent, total fatty acid 248 mg. per cent) to 950 mg. per cent (total cholesterol 161 mg. per cent, total fatty acid 789 mg. per cent) over a period of seven days on a diet solely of carbohydrate.

Bischoff[14] has recently reviewed the literature and the experimental evidence attempting to correlate different dietary conditions (vitamine D, protein content of diet, acid ash, et cetera) with the production of vessel changes. He concludes, "The progress of the research is at that stage where positive results are attained only by a degree of exaggeration which destroys their practical significance. . . . The uncertainty of the effect of the diet on blood vessel changes in man is an unwelcome spectre in the science of metabolism and medicine."

Infections, to which the diabetic patient is very susceptible,[35, 36, 37] are believed to exert a harmful effect on the intimal structure through their toxins[2, 3, 8, 22], and these areas of changed physiological status may be associated with the development of lipid deposit and secondary sclerosis at a later time.

The longer the duration of the diabetes, the greater will be the possibility for repeated insults (infections, periods of abnormal fat metabolism) to the arteries. With proper supervision of the diabetes or a mild condition well regulated, these results will be minimal. Therefore, as shown in Tables 1 and 7, the duration of the abnormal metabolism itself cannot be the only factor in these vascular changes. It is possible that the duration of improperly supervised diabetes may be related to the amount of calcification taking place; and the acuteness of the disorder, in which there is a predisposition to infection, ketonemia, and a high plasma lipid content, may be related to the amount of lipid deposited in the vessel wall. The latter condition would be ideal for the process of atheromatosis as given earlier in this discussion, and this interpretation may account for the differences in the lipid and calcium deposits found in the two children's aortae listed in Table 8.

Treatment has a marked effect upon the disordered metabolism. With the use of diets containing on the average of 140 grams of carbohydrate and insulin 29 units, the plasma lipids almost invariably approach normal. During the last year at the New England Deaconess Hospital Dr. L. B. Morrison reported that calcification in the arteries in the legs of young diabetic children has been less frequent than formerly. Xanthomata have disappeared. We feel more hopeful that precocious calcification will become still more rare in diabetes in the future.

SUMMARY

(1) Chemical analyses have been reported for the lipids, calcium, and phosphorus content of 25 non-diabetic adult aortae, 25 diabetic adult aortae, and six non-diabetic children's aortae.

(2) The process of atheromatosis is accompanied by definite changes in the lipid deposit, lipid allocation, and calcium and phosphorus deposition which are similar in the diabetic and the non-diabetic aortae. The diabetic aortae differ from the non-diabetic aortae in having exaggerated lipid changes and more calcification.

(3) The aortae from the diabetic patients of middle and later life show lipid changes, and increased calcium and phosphorus deposition comparable with non-diabetic aortae of an older age.

(4) The diabetic aortae show more marked calcium and phosphorus deposition than non-diabetic aortae with similar cholesterol deposits.

(5) The duration of the diabetes in the adult patients had no definite relationship with the chemical findings in the aortae.

(6) Severe diabetes of two years' duration in a child was associated with greater lipid, but less calcium and phosphorus deposition, in the aorta than was found in an aorta from a diabetic child having had uncontrolled diabetes of 8 years' duration.

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WHAT ARE DEATH RATES IN MASSACHUSETTS DOING?*

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IN these times of restricted resources, rational direction of effort is even more imperative than before. To spend funds unwisely may be more reprehensible than not to spend funds at all. But, like the virgins, how can we tell at the moment what is wise and what foolish, what is factual and what emotional? We feel, we hope, we opine that this or that is worth while, but we so seldom know. Then when what we hope would happen does happen, we find so many complex factors at work that it is difficult to feel sure that the result was accomplished because of rather than in spite of our efforts. In all this confusion and economic pressure we must, therefore, review, investigate, evaluate and appraise as never before, that wisdom may not permanently be kept from us. And all this while we still run. Like Atlanta we cannot indulge in the luxury of sitting while we consume the apple, but must make apple-sauce while we still run.

To reconstruct dinosaurs from footprints must be thin reconstructing, as is the reconstruction of socio-medico-economic phenomena from death returns. But as with prehistoric mammals, death records are probably the most dependable records that the sands vouchsafe to us. So it seems worth while to review death rates by ages and causes over a period of twenty-five years and see what suggestions appear from the changes that have taken place.

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In a previous article[1] we reviewed this material not from the point of view of rates but rather considering the relative prominence over twenty years of the more frequent causes of death by age groups. It seemed that if our knowledge were being made generally available (which proposition, Heaven knows, Pollyanna alone could advance) the most marked depression in prominence of causes of death should be in those diseases concerning which our diagnostic, therapeutic and prophylactic knowledge was the most precise. In other words, we used this as a rough test of the State's ability to organize in order to use knowledge. We found four points which were favorable and nine that were unfavorable, and that from one of the states of a Union which feels that perhaps the greatest star in its firmament is its ability to organize!

For the present study we have used three year averages, indicated by the middle years, 1906, 1916 and 1926, thus avoiding the distortion caused by influenza in 1918, and a two-year average for 1930 and 1931 indicated as 1931. The rates have been calculated for each age group and for all ages for the ten diseases for each group which in 1931 had the highest rates. (See table.) The total rates for each age group are also given.

From this latter tabulation a good deal of interest appears. The following shows in decreasing order of magnitude the percentage of change in twenty-five years in total death rates by age groups:

1-4 yrs., 69%; under 1 yr., 58%; 10-14 yrs., 55%; 5-9 yrs., 53%; 15-19 yrs., 52%; average 57%.
20-29 yrs., 49%; 30-39 yrs., 45%; 40-49 yrs., 31%; average 42%.
50-59 yrs., 21%; 70+, 21%; 60-69 yrs., 14%; average 19%.

The decrease for the rate from 1906 to 1931 for all ages is 31%. This decrease falls in the age group 40-49.

This shows again what is generally known, that although there is some slight scrambling of age groups, the greatest improvement in death rates has been among the younger ages. The cynic, of course, says that if infants and children are not allowed to die decently in their cradles, people must die more rapidly in old age or live forever. The fallacy of this statement is apparent when the figures are slightly rearranged.

Average decrease in death rates of the four age groups 14 years and under	59%
Average decrease in death rates of the four age groups 15 through 49 years	44%
Average decrease in death rates of the three age groups 50 years and over	19%

It is obvious that during this twenty-five year period the maximum age that any in the first group could have attained is 40 years, so that children saved in this period of maximum improvement of rates were not old enough to enter the third group and thus prevent the more favorable improvements shown in the other two groups. These same figures would seem also to answer that argument which is evidence of an aging digestive system, namely, "the coddling of the unfit". Were the "unfit" coddled in infancy and childhood they would be expected to die at a greater rate when they reached the "uncoddled" age of young adulthood. Such is not the case. We know of no theory that "in the good old days" the doorposts of the future "fit" were marked so that the angel of summer diarrhea might pass them by and work his death dealing beneficence on the would-be "unfit". Presumably, our graveyards of those days harbor potential Lincolns and Kallikaks in about the same proportion as our market places.

Further, it is interesting to consider the age groups in increasing order of magnitude of the total death rate of 1931. They arrange themselves as follows: (1) 10-14, (2) 5-9, (3) 15-19, (4) 20-29, (5) 30-39, (6) 1-4, (7) 40-49, (8) 50-59, (9) 60-69, (10) Under 1*, (11) 70+.

The unfavorable position of the infant rate (tenth) shows that we do well not to be complacent in this matter. Also, health officers are wise in considering 1-4 years the neglected period of childhood. Other than this (except that 10-14 stands higher than 5-9) the rates increase with advancing age groups. The total death rate of 1148 falls between groups 7 and 8 or at about the fiftieth year. The most crying numerical need, then, for life saving is over 50 and under 1. But whether a somewhat lower death rate in some of the younger age groups is still economically more significant is perhaps a matter for economists. Up to 20, or certainly up to 15 years of age, the individual has made little or no return to the community for its investment in rearing him. From then on for 30 or 40 years such return is made, if at all. If this is so, the most "economical" ages for the higher death rates are the youngest and the oldest. We should, then, not be too disturbed that the pre-school child rate is sixth, and should prefer to see the rates for 5-14 years shifting from the two most favorable places and giving precedence to the next two age groups, 15-29 years. Or is this as poor economics as it is humanities, and is a general desire for a continued diffuse depression of the rates in all ages as specific as we can be?

We should probably find gratification in the fact that the striking decreases over twenty-five years in rates for all ages are in the communicable diseases (pneumonia, diarrhea and enteritis, and tuberculosis) though goodness knows what has been done on any appreciable scale to influence favorably the pneumonia rate. The striking increase in the degenerative disease rates is, of course, the ominous cloud on the socio-medical horizon. However, in the last five-year period the rate of increase of deaths from cancer and heart disease has slowed up. Is this merely transient?

Under 1 year, prematurity and injury at birth are responsible for more than twice as many deaths as any other cause. Eighteen of the twenty-one deaths from these causes per 1,000 babies born alive occur before the end of the first week. In fifteen years this rate has improved only 7%. Diarrhea and enteritis have had the greatest drop (2902 to 424). The death rate from malformations is increasing. We are somewhat surprised that the rate for whooping cough, while prominent, has decreased. Pneumonia had the second highest rate both in 1926 and 1931. Its rate in this age group is almost twice that in any other and it had the least proportional drop. About five sixths of the deaths were after the first month of life. Although tuberculosis was the third greatest cause of death in 1906 it has disappeared from the list of the ten chief causes of death in this age group in 1931.

In the age group 1 to 4, 54% of all deaths

*This rate, as in the table, is usually expressed in terms of deaths per 1,000 live births. For this comparison we have expressed it in terms of 100,000 live births which gives the figure of 5761.

in 1931 were due to communicable diseases and 14% to accidents. The death rate from diphtheria is highest in this age group and appendicitis is higher here than in any age group up to 50. The rate for each disease except appendicitis and malformations is lower now than twenty-five years ago. Pneumonia has had the greatest actual decrease, but still causes the same number of deaths as diphtheria, measles, tuberculosis, and whooping cough combined. The drop in the tuberculosis rate is very gratifying (162 to 30 or 81%). In this age group the communicable diseases are more prominent than in any other, giving seven of the ten principal causes of death. Although the rate from "all causes" for this age group is still unwarrantedly high, it shows the greatest drop (69%) of any age group from the rate of twenty-five years ago. It is also gratifying that the second decade shows a more rapid fall than the first (40% in 1916 to 1926, and but 20% in 1906 to 1916).

In the age group 5 to 9 all communicable diseases show a decreased death rate. The greatest actual decrease is in diphtheria, which was enormously speeded up in the last decade under consideration, as of course it should have been. In 1931, 1926 and 1906 the trough of the tuberculosis death rate occurred in this age group, while in 1916 it appeared in the next age group, 10-14 years. An advancing trough of tuberculosis death rates would seem to be economically desirable. Heart disease first appears as one of the first ten causes of death in this age group. From here on it never falls below fourth place. "Accidents" is the first cause of death in this and the next age group. The death rates from this cause are increasing in all age groups from 50 on. Surely we are slaughtering our grade school children, our adolescents and our aged. Can any satisfaction be found in this?

In the age group 10-14 we find the lowest total death rate of any group. The two principal causes of death are accidents and heart disease which together account for 35% of all deaths in this age group. The decrease in the diphtheria death rate since 1906 is about proportional to that in the 1-4 and 5-9 age groups.

In the age group 15-19 tuberculosis leads as a cause of death, as it does in the next two age groups. Tuberculosis causes 23% of all the deaths in this age group and is working up to its position of maximum prominence. Appendicitis which had the highest death rate in any of the age groups in 1926 is now lower than in 1906.

In the age group 20-29 tuberculosis accounts for almost one third of the total deaths. In 1931 it caused nearly as many deaths as accidents, heart disease and the puerperal state combined which were the next three most frequent causes. In the first decade under consideration (1906-1916) the decrease in the tuberculosis rate was 15%, while in the second decade (1916-1926) the decrease was more than doubled, 38%. While the rates run fairly close it is only in 1926 that this age group exceeds the next, 30-39, in the rate at which tuberculosis kills. The tuberculosis battle is far from over. In the three age groups of which this is the middle, the puerperal state appears among the ten highest causes of death. In this group it accounts for almost one in every eleven deaths. If female deaths alone are considered, the frequency is increased to about one in every six deaths. From now on the death rate from heart disease more than doubles in each succeeding age group.

In the age group 30-39 tuberculosis shows a decrease of 64% while pneumonia shows a decrease of 54% as compared with 1906. During this same period the accident rate has decreased about 33%. Although in 1926 the prior age group (20-29) led all others in its tuberculosis rate, in 1931 this age group (30-39) ties with the next (40-49) for the lead. This latter age group (40-49) has never led before and gives the suggestion of an increasing relative prominence of tuberculosis in older ages, which, of course, may not hold up. It will be interesting to see how the present period of stringency affects these rates. From the 1931 figure its effect on tuberculosis seems to lag. The rate from the puerperal state is highest in this age group, as it was in 1926 and in 1906. Is the reason physiological or environmental? This is the middle of the three age groups in which suicide appears among the first ten causes of death. While its presence impairs any smugness we may have with our "civilization" it is gratifying that for two of the age groups the rates are essentially those of twenty-five years ago and appreciably less than in 1916 when we were at war.

In the age group 40-49 the heart asserts its dominance as a cause of death and maintains it through the remaining age groups, though cancer is running it a strong second. However, in the two decenniums, 40-59, the rate for heart disease has decreased 10% since 1906, while that for cancer has increased 19%. Can the application of our knowledge prevent cancer from outstripping heart disease? Tuberculosis is still high, though less than half of what it was in 1906, and it remains about constant until the over 70 age group. Suicides are at their peak here and are even higher than in 1916. Perhaps this means that life grinds hardest in the forties.

In the age group 50-59 the rate for heart disease alone more than equals the total death

LEADING CAUSES OF DEATH B

RATES PER 100,000 POPU

AVERAGE 3 YEARS[1]

	Under 1				1 - 4				5 - 9				10 - 14				15 - 19				20 - 29		
	1931	1926	1916	1906	1931	1926	1916	1906	1931	1926	1916	1906	1931	1926	1916	1906	1931	1926	1916	1906	1931	1926	1916
Injury at birth—Prematurity	2147	2226	2321	—[3]																			
Pneumonia	969	1161	1466	1380	107	191	296	333	16	23	25	30	9	13	12	18	12	17	19	23	19	23	33
Malformations	753	764	679	230	11	11	8	10															
Diarrhea and Enteritis	424	705	2288	2902	27	44	153	147															
Congenital debility[2]	170	325	696	4066[3]																			
Whooping cough	107	179	187	256	19	38	37	44															
Diseases of the thymus	103	117	—[3]	—[3]																			
Accidents	63	79	109	64	64	78	91	77	43	60	55	45	27	32	38	35	40	42	44	41	40	41	53
Erysipelas	54	45	69	50																			
Influenza	47	76	46	34																			
Tuberculosis					30	56	109	162	10	13	32	37	11	16	29	40	43	72	112	142	84	120	193
Diphtheria					26	49	130	159	13	24	65	69	3	4	14	16							
Measles					22	55	63	45															
Appendicitis					17	13	7	3	13	11	10	9	11	13	13	10	10	15	13	12	10	10	10
Scarlet fever					16	18	26	37	6	9	10	16											
Heart disease									14	19	31	28	16	28	32	34	22	30	38	35	25	31	40
Diseases of the ear									7	7	1	0[4]											
Diseases of pharynx and tonsils									6	7	8	5											
Anterior poliomyelitis									5	6	10	—[3]	4	3	2	—[3]	3	8	8	—[3]			
Nephritis													5	6	8	9	7	8	11	16	12	12	2
Epilepsy													3	3	3	4	3	4	5	3	4	4	
Rheumatic fever													3	3	4	10							
Puerperal causes																	5	7	8	6	26	31	3
Leukemia																	3	3	4	2			
Cancer																					8	7	
Suicide																					9	7	1
Apoplexy																							
Diseases of the arteries																							
Angina pectoris																							
Diabetes																							
Diseases of prostate gland																							
Total death rate	5761	7044	9969	13701	460	725	1207	1510	183	237	328	390	124	167	201	274	190	253	321	396	289	352	49

[1] Two-year average 1930 and 1931.
[2] Congenital debility includes prema
[3] Not listed as such.
[4] Rate less than .5 per 100,000.

AGE GROUPINGS

ON

06	30 - 39				40 - 49				50 - 59				60 - 69				70+				All Ages			
	1931	1926	1916	1906	1931	1926	1916	1906	1931	1926	1916	1906	1931	1926	1916	1906	1931	1926	1916	1906	1931	1926	1916	1906
																					36	46	59	—[3]
39	37	47	64	81	65	72	116	113	103	129	200	217	214	264	434	438	570	690	1209	1090	92	117	172	177
1	42	44	55	63	52	61	77	72	86	81	101	80	136	131	127	109	357	344	320	264	68	70	75	69
6	87	107	203	244	87	102	185	200	80	99	159	187	78	102	139	190					62	82	142	211
7	13	13	9	7																				
6	51	56	80	73	120	126	157	149	318	332	372	347	879	903	905	824	2678	2757	2517	2029	236	231	210	186
1	25	28	42	50	57	62	92	87	135	150	193	177	315	350	405	374	806	860	956	690	83	85	93	75
5																								
4	29	34	37	31																				
3	35	35	35	32	115	118	124	106	299	304	288	252	629	631	545	455	1005	1009	915	657	136	130	105	84
3	14	12	15	13	23	19	21	19																
	9	9	13	20	38	43	55	57	145	162	169	187	428	474	481	493	1139	1387	1508	1298	98	105	97	95
					18	6	7	5	51	28	43	23	179	125	233	104	754	880	1319	514	52	45	58	24
					15	12	6	12	43	43	23	28	108	100	72	59	194	204	172	112				
									46	45	49	37	134	116	107	78	187	150	138	84	24	20	20	14
																	85	92	60	78				
	443	496	695	813	779	830	1092	1129	1614	1718	1985	2036	3590	3716	4098	4184	8614	9402	11079	10880	1148	1251	1483	1676

5-1907.

rate of the age group 20-29. With cancer it causes 38% of all deaths in this group. The degenerative diseases account for seven of the ten principal causes of death, while in the 40-49 age group they account for six. These degenerative diseases produced 64% of the total deaths in this age group. While the total rate has dropped 21% since 1906, the combined rate for these seven degenerative diseases has remained essentially constant, the saving being largely in tuberculosis and pneumonia. Although the economics of degenerative disease control may be questioned in some of the later age groups, certainly this is too young for our people to break down in view of the investment in public education and the like which they represent. With each succeeding age group from now on the pneumonia death rate doubles.

In the age group 60-69 the general picture is essentially the same though the same degenerative diseases occupying seven of the ten most prominent places account for 74% of all the deaths. Also, here heart disease as well as cancer is increasing, the increase over the 1906 rate for heart disease being 7% and for cancer 38%. The two communicable diseases, pneumonia and tuberculosis, have fallen, the combined rates being but 46% of those for 1906. These two diseases largely account for the savings that have reduced the rate from all causes some 14% from 1906.

In the age group 70 and over heart disease has complete mastery, accounting for more than a quarter of all deaths. Apoplexy has displaced cancer for second place. Tuberculosis has disappeared from the ten principal causes, and this is the only age group except that under 1 where this is so.

SUMMARY

1. Largely through savings in pneumonia, diarrhea and enteritis, and tuberculosis the steady increase in degenerative diseases has been offset and the death rate in 1931 is 31% lower than twenty-five years before.

2. There is no evidence from this study that the physically "unfit" are being "coddled" in childhood, since while the decrease in twenty-five years in total rates of 14 years and under is 59%, in the 15-49 age groups it is 44% and in the over 50, 19%. Such "coddling" would be expected to increase the rates in middle life.

3. The most crying need in pure life saving is in the field of chronic diseases which dominate from 40 years on. However, it is true that the savings largely in tuberculosis and pneumonia have produced decreases in total rates in these age groups.

4. The statement that the principal savings in tuberculosis have been among the young and the old is not substantiated. In twenty-five years the tuberculosis death rate in the age group 14 and under has dropped 91%, in the age group 15-39 68%, and in the age group 40 and over 59%. While it is true that in all three groups the rate has speeded up in the last fifteen years under consideration, the rate of drop has decreased with the age of the group, being 75%, 58% and 51%, respectively. So that while we must concentrate on control measures in the adolescent and young adult groups, efforts directed at any age group will presumably spill over their benefits to others.

5. In twenty-five years the accident rates for the age groups 50+ have increased.

6. While suicide appears among the first ten causes of death in the ages 20 to 49, reaching its peak at 40-49, in the 20-39 groups rates are essentially the same as in 1906 and lower than during the war.

7. The puerperal state kills among the first ten in the ages 15 to 39, with a peak at 30-39. The rates have fortunately been lowered slightly over 1916.

8. Appendicitis kills among the first ten causes from the ages 1 to 39. The peak is in the age group 1-4 where the rate is 467% higher than twenty-five years ago. Surely this needs all the attention that can be given to it!

9. With the marked improvement in death rates from the diarrheas and enteritis in the age group under one, prematurity and birth injuries are becoming relatively more prominent as causes of death.

10. While the pre-school age group (1 to 4) shows the greatest proportional drop in total rate since 1906, 69%, it was the sixth from the lowest rate of the age group considered, whereas with the tendency for rates to increase with age it should be second. True, it has moved from the seventh place which it occupied twenty-five years ago. Seven of the ten principal causes of death are communicable diseases which account for 54% of all deaths. All of these communicable disease rates have dropped. Since both measles and influenza kill in much the same way, through the complicating pneumonia, the prevention of exposure and adequate nursing are of cardinal importance. This age group warrants all the attention which pediatricians and health officers are lavishing on it.

11. There has been a great decrease in the death rate from diphtheria in the age group 5-9, particularly in the last fifteen years.

12. Consistently the age group 10-14 shows the lowest total death rate.

REFERENCE

1 Bigelow, George H., and Hamblen, Angeline: Changing causes of death. New Eng. J. Med. 202: 215 (Jan. 30) 1930.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 19251

CONTINUED FEVER WITH SEVERE PAIN IN THE BACK

MEDICAL DEPARTMENT

An Italian merchant fifty-two years old entered complaining of pain in the lower thoracic and lumbar regions of two months' duration. There was great language difficulty in obtaining the history. Important additions were given later by his son.

For "ten years" he had been having periods of nervousness, chills, sweating and complaints of various aches and pains. These attacks had become more frequent during the past two or three years. Many physicians had failed to find anything wrong. The patient's family felt that the attacks were of a temperamental, nervous nature. During these ten years his bowels had been constipated. Two years before entry a physician in Rome made a diagnosis of duodenal ulcer, but without x-ray examination. The patient had lost 50 pounds and had had melena, but apparently entirely recovered and regained his weight. A year before entry, in Italy, he had tarry stools on two or three occasions.

Several days before the onset of the present attack of pain he had loss of appetite. The onset of the pain was with a slight chill lasting ten minutes, followed by a fever of 101° (taken at home). The pain was sharp and constant, not radiating except to travel around anteriorly, following the costal margin, four or five times a day, very severe, of equal intensity on both sides and lasting half an hour to an hour. The fever lasted a month with daily swinging, 100° a. m. to 102° p. m. Since the onset of the present attack he had had sweating every night. During the first month he had a slight afternoon chill daily, during the second month once in two or three days, followed by fever. During the past week there had been marked increase in the severity of the pain and he had had daily fever, 100° a.m. to 102-103° p.m., but no chills. Since the onset of the present attack he had urinated twice at night. One month before admission while he was in a private hospital for a week there was a laboratory report of microscopic blood in the urine at one examination.

The family and past history are not significant. He denied all diseases, including malaria. Twenty-one years before entry his head and ear were injured in a mine accident. Nineteen years before entry he had an appendectomy.

Physical examination was essentially negative except for pain in the lower dorsal and lumbar spine on bending to either side.

The urine was normal in amount, specific gravity 1.020, the slightest possible trace to a very slight trace of albumin, rare to occasional white cells. The hemoglobin was 60 to 65, the red cell count 3,400,000 to 4,040,000, the white cell count 6,800 to 4,750, polymorphonuclears 75 to 66 per cent. The entrance smear showed slight achromia, slight to moderate polychromatophilia and variation in size, very slight variation in shape, rare stippled cells, platelets normal. Another smear three days later showed the platelets slightly increased, two young polymorphonuclears. The stool was normal except for a little mucus. Tuberculin tests, human and bovine, were negative.

The temperature at entrance was 102.6°, falling to 99.9° on the third day, then swinging up to 102.8° on the fifth day, down to 98.2° on the sixth day, up to 101.1° on the seventh, later 98° to 99.5°. The pulse was 72 to 109. The respirations were normal.

A Graham test showed a normal gall bladder. X-ray showed no evidence of organic disease in the gastro-intestinal tract. Chest examination showed the diaphragm high on both sides. There was thickening and beading of the larger lung markings and the lung roots. A dense linear band was seen in the left lung field extending outward from the lung root along the anterior end of the fourth rib. There were no definite areas of consolidation in the lung field and no large mediastinal masses. There was spur formation in the dorsal vertebrae, most pronounced in the eighth, ninth and tenth; it could be due to old trauma. There was narrowing of the joint space between the first and second lumbar vertebrae, probably due to destruction of the joint cartilage. No bone destruction was seen.

A lumbar puncture in the fourth-fifth lumbar interspace was negative.

The patient ran a persistent septic temperature for the first week, with sweats and much real discomfort and apprehension. During the last five days the temperature was little above normal. On the twelfth day he was discharged improved.

CLINICAL DISCUSSION

DR. RICHARD C. CABOT: This is an unusual history. We might read through a great many thousand histories and not see one like this, in that we have a very marked and lasting fever without any obvious cause. There is no disease that I know of that produces both such fever as he has and such intestinal bleeding as he has had. We have to account for something that produces this severe back pain and I want, be-

fore I get through, to know more exactly where this pain was. The back and lower chest is a very large region. Pain and fever are his two symptoms aside from this dubious history of melena and the diagnosis of duodenal ulcer without x-ray.

There is definite evidence of a secondary anemia. "Platelets slightly increased, two young polymorphonuclears" means nothing of any value to us.

The chart shows five or six days with fever and four without, the pulse hardly ever over 100 and the respirations normal. So the fever here was not like that which he was credited with having had outside. That is a continued fever rather than a swinging fever, but still it is a well marked fever.

They are looking for the source of this presumable infection, and they do not find it in the gall bladder. I think we had better see the films.

DR. GEORGE W. HOLMES: We have a considerable series of films without any very definite evidence of disease so far as reported. We see the shadow of the gall bladder. It is quite a definite shadow which decreased somewhat after food, and there are no visible stones. We have a film of his chest. The high position of the diaphragm is probably normal for this type of man. The prominent lung markings mean nothing, and the lines described as running out to his fourth rib probably mean nothing either. His heart shadow does not seem to be particularly enlarged or abnormal in shape and there are no mediastinal masses,—an essentially negative examination.

Then we have a series of films of his spine. There are distinct proliferative changes about the bodies of the vertebrae, more marked in the lower dorsal region. There is also some narrowing of the joint spaces. All of these changes I should think were consistent with arthritis of the type we often see in older men.

DR. CABOT: There is no evidence of tuberculosis or of malignant disease in the bones.

DR. HOLMES: No.

In this film you see the outline of the left kidney fairly well. The right kidney is less clear but I think not enlarged or abnormal in shape and there are no stones. Here is a film which shows the bands of dullness running out from the left lung a little better than the others.

A STUDENT: What does that mean, sir?

DR. HOLMES: I think it is probably a thickening in the interlobar septum, although if it were on the right side we should be more sure of it; but we may have a similar anatomical variation in the left lobe with thickening in the septum. I do not see how it could account for his symptoms. There is nothing unusual in these films. There are some shadows scattered along his colon in the sigmoid region which could be diverticula. That is the only lead found,—possible diverticulitis of the colon.

DR. CABOT: It really does not show diverticulitis, just diverticulosis.

DR. HOLMES: Yes.

DR. CABOT: It is quite obvious that they have kept back something from us, which it is quite proper they should do. It is for us to say what it was they found and treated, whereby they brought his temperature down, and I do not believe we are going to be able to do it.

DR. TRACY B. MALLORY: I do not believe they treated it, Dr. Cabot. He left because he felt that nothing was being done for him.

DR. CABOT: Here then is a case with two symptoms essentially,—pain in the back and fever. I have just reread the only description given of his pain, and it is of the vaguest type. It indicates the lower thoracic and lumbar regions. That covers a space about two feet square. It does not say on one side or the other, or how high or how low down. I have often seen pain of this kind in tuberculosis of the vertebrae. I was hoping Dr. Holmes would find that. Tuberculosis of the vertebrae can give pain and fever of that sort perfectly well. But of course we have to be guided by the results of the repeated x-ray examinations. We took a lot of films; we had a good chance to see, and the films do not show it.

There is a diagram in the record which gives us a little light, but not much. The two spots specially marked are just at the bottom of the spine, opposite the twelfth rib. Another spot is just at the top of the sacrum in the middle. But if we have neither tuberculosis nor malignant disease, as I believe, then those two spots do not indicate anything significant. Of course the orthopedic specialists are always telling us we have pain due to this kind of hypertrophic spinal arthritis. I do not believe it. I have seen it without pain too often. At any rate that could not be the sole cause of these symptoms, because hypertrophic arthritis never causes fever. So I think we can rule out the idea that it has anything to do with the main symptoms of this case.

I do not know what to do with this fever except to attack it on the general diagnostic plan. My study of one thousand cases of lung fever in this hospital showed that over ninety per cent came within three classes: tuberculosis, typhoid fever, sepsis. There is nothing here to suggest typhoid fever. There is nothing that I can see to suggest tuberculosis. Where could it be if it were tuberculosis? It certainly could not be in his lungs without cough or x-ray lesions. It could not be in his kidneys, I should say, without urinary or other local changes. He has not, so far as I remember, any important urinary changes.

A STUDENT: A few red cells; I think that is all.

DR. CABOT: That is nothing. So we have no evidence of tuberculosis in the kidney; we have no evidence of tuberculosis in the intestines or in

the suprarenals or in the glands. So I cannot diagnose tuberculosis. It looks like a septic type of fever. If it is not I do not know what it is. I have seen very few cases of undulant fever, only a few reported in the journals. It is conceivable that because I know so little about undulant fever this could be that disease. The pain in his back I suppose conceivably might be merely the pain one gets with that as with all sorts of infections, such as smallpox and dengue. If it is accounted for in that way then this is merely a question of what the blood showed.

A STUDENT: I am told there is an article* in the *Journal of the American Medical Association* with report of a case of undulant fever with spondylitis with involvement of the intervetebral disks in the lower lumbar segments.

DR. CABOT: I do not know anything about that, and shall have to await further enlightenment.

A STUDENT: It would be perfectly proper to call this undulant fever if we had an agglutination test in the blood for the bacillus abortus, which is the same I believe as the micrococcus melitensis.

DR. CABOT: Yes. Apparently they made no agglutination test for that organism.

MISS PAINTER: An agglutination test was done, but the result is not entered in this record.

DR. CABOT: So we do not seem much wiser. We have showed our wisdom only by saying that we should look for it. The white count with an undulant fever would be low, as it is here.

A STUDENT: I think you do get melena at times, and sometimes slight kidney involvement in undulant fever.

DR. CABOT: I did not know that.

I want to think what other causes of fever there are. Hodgkin's, but we have no evidence of that. Bacterial endocarditis, but we have no evidence of that. We get fever with several types of malignant disease, but I do not see that we have any evidence of malignant disease. There is fever with syphilis, especially in the textbooks. I have seen very little of it in clinical work. I do not see that we have any evidence of syphilis. So that I should say that if we do not find some further evidence through the agglutination test for the organism of what is called Malta fever and undulant fever, we shall have to leave it as fever of unknown origin.

A STUDENT: Do you ever get fever with intestinal parasites?

DR. CABOT: I don't know of any.

A STUDENT: Could it be malaria?

DR. CABOT: No, because you have to have a visible local lesion either in the blood or in the spleen. He denied malaria but he might have had it just the same, and the low white count would go with it. Of course we are not told anything about it in the blood. The blood would have to show it and the spleen would have to show it. I should say we have no reason to make that diagnosis on the facts given us.

A STUDENT: How many diseases are there that they do not treat if they do make a diagnosis?

DR. CABOT: I cannot answer that.

A STUDENT: Just as a question, unrelated to the diagnosis, would the tuberculin test in a case of tuberculosis sometimes be negative?

DR. CABOT: Yes; but I think our clinical negative evidences about tuberculosis are the most important ones.

I was thinking of perinephric abscess at one time. That can give just such a fever as this. But it does not ordinarily go down and the patient is not ordinarily discharged improved without an operation. Moreover the pain is not such at all as is ordinarily present in that disease. It is a one-sided disease, with tenderness and local symptoms, which this man does not have. I cannot think of any type of sepsis that would fit that case.

Perhaps Dr. Mallory now will let the animal out of the bag.

PATHOLOGIC DISCUSSION

DR. MALLORY: I think we have the cat in bag. The blood culture, which was not reported until after the patient had left the hospital—not from mere delay but because nothing grew out until after that period—showed a pure culture of bacillus abortus. It seemed to be of the type we usually get here and not one of the melitensis strains which he might have got on his last trip to Italy. I do not imagine that this attack of fever was his last one. He had been in three or four hospitals before, each time with about the same story, and he would get a little better and go out.

DR. CABOT: And the pain in the back presumably was the pain of infectious disease?

DR. MALLORY: I should imagine so. The organism can localize in a variety of places. It is possible to have an endocarditis with it, but there is no evidence of it here.

A STUDENT: When cures are obtained, does it mean that the infection was localized, or may there have been a septicemia as well?

DR. MALLORY: They may have either.

A STUDENT: Is there any mention made as to whether this perspiration was especially odorous? Isn't that a point, that there is a rank odor?

DR. CABOT: Of no importance, I think.

A STUDENT: How reliable are the serological tests?

DR. MALLORY: The agglutination test is ordinarily positive but occasionally negative, even when one succeeds in growing organisms, I believe. Once in a while it is possible to pick up

*See Undulant (Malta) Fever Spondylitis, Jacob Kulowski and Theodore H. Vinka, J. A. M. A. 99:1656, Nov. 12, 1932.

a case by doing a sensitization test such as we do with tuberculin. I have seen a very strong reaction under such conditions. The difficulty is that sometimes the reactions are so strong that they produce extensive necrosis. The few physicians who have tried them are not enthusiastic about them, largely for that reason.

LATER NOTE

Seventeen months after leaving the hospital the patient reported to his physician for a slight cold. He said he had had no fever or pain for fifteen months, and considered himself cured of the disease that brought him to the hospital. It is of some interest that during this period he had been under special strain owing to business and family troubles.

DR. RICHARD C. CABOT'S DIAGNOSIS

Undulant fever?

DIAGNOSIS (FROM HOSPITAL RECORD)

Undulant fever.

CASE 19252

PROLONGED FATIGUE FOLLOWED BY ACUTE ARTHRITIS

CHILDREN'S MEDICAL DEPARTMENT

DR. FRANCIS J. AWDZIEWICZ*: This is the case of a six year old white American born girl who was sent to the hospital March 27 by her physician. The chief complaints were pain in the hip and knees and attacks of shortness of breath.

Present illness. On December 24, three months before entry, the patient complained of fever (100°), cough, and general malaise. She remained out of school two weeks, but was in bed only two days. She recovered fairly well, but seemed to be tired out most of the time. About one month before admission she had attacks of vomiting before breakfast every three or four days. Two weeks before admission her fatigue was much more marked and she complained of pain in her knees on stooping. For one week prior to hospitalization she had been in bed because of severe pain in her knees; three days later there was similar pain in the right hip. She had received daily for one week fifteen drops of a green medicine prescribed by her physician.

Past history. She had always been very well, had had none of the acute infectious diseases of childhood and no previous arthritis, but she had suffered from frequent colds in the winter.

The family history was negative except that her maternal grandfather had rheumatism when over fifty years old, an aunt died of rheumatic fever at fourteen years of age and a cousin died at seven with heart trouble.

Physical examination on admission revealed a fairly well developed and nourished girl with somewhat pale skin who complained of severe pain in her right hip and both knees. Both hips were painful when moved and touched, the right more than the left. Both knees were somewhat swollen and tender. The right ankle was also swollen and very tender; the left was less tender and not enlarged. The tonsils were of moderate size and cryptic. The lungs were clear. The heart was enlarged. The apex impulse was visible and heaving one centimeter outside the nipple in the fourth interspace. There was no thrill, but a loud blowing systolic murmur was heard over the entire precordium, loudest at the apex and transmitted to the axilla and the back. There was a low pitched diastolic murmur at the apex. The pulmonic second sound was very loud. The liver was enlarged and tender. The blood pressure was 110/75.

The temperature was 103°, the pulse 130. The respirations were 30.

Course. Aspirin was tried, nearly every dose of which was vomited. Pyramidon was then given and retained. The temperature dropped in twenty-four hours, later varying between 100° and 98°. The arthritis lasted two weeks after the drop in temperature. The white blood count remained between 13,000 and 16,000. On April 28 at five a.m. the child felt sick and vomited. Her pulse was rapid and irregular. The lips and finger tips were blue. A diastolic murmur was heard at the left of the sternum. Her temperature began to show wider swings, 97° to 103°; her color was more pasty; she was quite apathetic; her face seemed puffy. The heart became enlarged to the anterior axillary line. The liver and spleen were enlarged and tender. She could retain no oral medication, and morphine did not alleviate the severe abdominal pain. She was given paraldehyde by rectum, 50 per cent glucose intravenously, and morphine. She localized much of her pain in the right upper quadrant. On May 8 she died.

CLINICAL DISCUSSION

DR. RICHARD C. TEFFT: This case, while it does not present any particularly difficult diagnostic problems, shows rheumatic heart disease at its worst. On admission we had no idea that the child was going to have an acute flare-up as she did, and die.

The history was that of an ordinary rheumatic heart disease such as we see in the hospital in children. Probably she had some heart involvement back in December at the time of the first illness because of the marked weakness after that. But there was no definite evidence of heart disease until a week or two before she entered the hospital, when her doctor discovered heart disease and gave digitalis. At least that is what we assume the green medicine was. We do not ordinarily in acute heart disease give

*Interne on the Children's Medical service.

digitalis because we feel that in dealing with acute endocarditis we are dealing with a toxic condition and it is hardly worth while to poison the heart any more when it is already poisoned with the toxin of the disease.

We felt that this was probably her first attack of heart disease and that she did not have very marked damage to her valves at the time we first saw her. We tried her on aspirin. She could not retain it and we changed to pyramidon because the work that had been done a year or two previously in a hospital in New York seemed to show that pyramidon is about as satisfactory a treatment for heart disease as aspirin and does not affect the stomach nearly so adversely.

In the ward she was getting along about as well as the average child with heart disease and we had no reason to suspect that she was not going to be perfectly well until she suddenly had an acute flare-up.

It is interesting to notice how the heart dilates under the severe toxemia that comes with an exacerbation of rheumatic heart disease. It shows the extreme toxicity of a process which will result in the heart's dilating so that the left border is in the axilla. When that condition arises there is very little to be done. We gave her morphia and waited to see if she would recover. She did not.

I think the cause of her extreme abdominal pain is open to speculation. We thought she might have had some mesenteric thrombi because we had seen a case not long before with considerable abdominal pain that had shown a number of mesenteric thrombi. That, however, is not necessarily so. Sometimes these patients get severe abdominal pain simply from the adenopathy that goes with rheumatic heart disease. Sometimes they get it without showing much adenopathy, and just what causes it I do not know.

I am inclined to think that she probably will not show too much damage to the heart valve, perhaps small vegetations. Whether or not she will show any thrombi I do not know. I think the evidence is about equal in favor of thrombi or adenopathy.

Dr. Harold L. Higgins: If you review the family history in this case, you will find two cases of rheumatic fever. I think we are recognizing more and more family histories of rheumatic fever, several cases in a family, which seem to be of a contagious nature rather than due to a familial tendency.

The story of the child's being tired out before the onset of the acute attack of arthritis points quite well towards some myocardial involvement. Of course, however, that is not at all certain. In the spring, we find a good deal of fatigue and lassitude in patients who are getting over grippe.

The arthritis in this case lasted for a considerable length of time. She had a high fever in the hospital one day, but her arthritis lasted two weeks longer.

The marked abdominal pain we might assign to one of four causes. It may have been due to decompensation with congestion of the liver and with pain from the enlarged liver. It may have been due to infarction. It may have been due to glands. Or we might call it the rheumatic peritonitis which is so common in the early stages of rheumatic fever. With this child dying apparently from a decompensated heart I feel that it was congestion of the liver that caused the marked pain.

I think the case stands out as one in which the most marked involvement was of the myocardium rather than the endocardium or the pericardium. In fact there is no evidence that she had pericarditis at all.

Dr. Paul D. White: I saw this child once, about a month before she died, and my findings then can best be expressed by reading my consultation note.

"Acute rheumatic heart disease with considerable enlargement, due I believe to both dilatation and hypertrophy. This morning the apex impulse is maximal in the sixth intercostal space 7 centimeters to the left of the midsternal line and 1.5 centimeters beyond the midclavicular line. The left border of dullness is 7.5 centimeters to the left of the midsternum in the sixth space and 4 centimeters to the left in the third space. There is no evidence of acute pericarditis—friction rub or effusion—though it is very possible that there may be some pericardial involvement. The myocardium is undoubtedly chiefly affected, with damage to muscle fibers resulting in dilatation. The murmurs are I believe primarily the result of the cardiac dilatation rather than the result of mitral valve deformity, although without doubt endocarditis (valvulitis) is present here (without much scarring as yet)."

That opinion was the result of a lesson learned from a number of instances of severe rheumatic infection in children with murmurs, chiefly mitral, but with very little found wrong with the valves afterwards.

To continue the quotation: "At the apex there are mitral systolic and diastolic murmurs and a diastolic thrill. I hear no aortic valve murmurs. The pulmonic second sound is accentuated and there is a diastolic gallop rhythm,"—rather unusual findings with no mitral stenosis, but the diastolic murmur and thrill were apparently quite pronounced at the time. "In view of the gallop rhythm and the myocardial involvement an electrocardiogram should be of much interest, to determine especially whether there is any heart block." None was found, which would indicate that the gallop rhythm, which was rather loud, means ventricular dilatation and not delayed conduction. "As-

sociated with the cardiac dilatation and weakness there are congestion of the liver, increased respiratory rate, and perhaps slight right hydrothorax. The prognosis is uncertain but probably favorable, so far as recovery from the present illness is concerned. I would advise the present therapy, adding digitalis if congestive failure increases. She should be a suitable case later for the House of the Good Samaritan. Residence in the south in the future, especially in the winter, would be well worth while in all probability if it could be arranged." That rather favorable prognosis was, however, a wrong guess. We probably should have banked more on the enlargement of the heart. When the heart is so much enlarged in an acute rheumatic attack the prognosis is distinctly unfavorable although by no means hopeless.

I think Dr. Bland and Dr. McGinn saw her and found no new findings except that the heart became larger under observation. The enlargement of the heart is the most important point with respect to the involvement of the heart muscle and to the prognosis.

I wish also to emphasize the fact that here again there is a family history of rheumatic infections. I also wonder if pericarditis will be found at postmortem examination.

DR. HIGGINS: Dr. Moriarty has gathered together some statistics from the five fatal cases of heart disease with acute abdominal pain seen on our service in the past year. At autopsy only one of the five showed infarcts of the liver and spleen.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Acute rheumatic fever.
Mitral stenosis and regurgitation, early.
Acute myocarditis.

ANATOMIC DIAGNOSES

Rheumatic heart disease.
Mitral insufficiency.
Cardiac hypertrophy and dilation.
Acute endocarditis, mitral and aortic.
Acute myocarditis.
Acute pericarditis.
Congestive heart failure.
Chronic passive congestion of the liver.
Ascites.
Pulmonary atelectasis.
Bicuspid pulmonary valve.

PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY: We found at autopsy acute rheumatic endocarditis of the aortic and mitral valves, very minute pinpoint vegetations. The mitral valve was not stenotic but in fact was considerably dilated, the circumference measuring 9 centimeters, which is almost the size of an adult mitral valve. This girl was only six years old.

The heart was markedly dilated throughout and also very definitely hypertrophied, weighing 200 grams, which is far beyond normal limits for her age. There was a fresh acute pericarditis.

The remaining viscera showed chronic passive congestion. There was ascites, but no evidence of peritonitis. There were no infarcts anywhere. The mesenteric glands were slightly swollen, not markedly so.

Microscopic examination also shows a very marked and definite myocarditis. You can see everywhere here the increase of fibrous tissue and collections of mononuclear cells in the less fibrous tissue between the muscle bundles.

Here is a pretty definite Aschoff body, a fairly sharp focal collection of large mononuclears. They are very numerous in this heart, a little more numerous towards the endocardial surface than outward towards the pericardial surface. Several of them are seen in the adventitia of the aorta, which shows also a very marked perivascular lymphocytic infiltration.

There is a pretty definite aortitis.

DR. WHITE: Was there any involvement of the endocardium over the ventricle?

DR. MALLORY: No. On the whole the diffuse myocarditis seemed to be the most important lesion in the case, the endocarditis and pericarditis being relatively slight. There was not enough fluid in the pericardium I should think to be a factor in the cardiac embarrassment. Certainly the vegetations on the valves produced no scarring at all.

DR. WHITE: How about the aortic valve?

DR. MALLORY: Nothing except tiny vegetations.

DR. WHITE: Did the ring seem to be stretched?

DR. MALLORY: No, but the mitral ring was very markedly stretched.

The pulmonary valve showed a congenital anomaly, only two cusps instead of three.

DR. WHITE: At the end was there an aortic diastolic murmur?

DR. HIGGINS: I do not believe we ever made a diagnosis of aortic insufficiency.

DR. WHITE: That may have been the mitral diastolic murmur.

DR. HIGGINS: That is apparently what they thought.

DR. WHITE: It is very significant that there was such a loud mitral diastolic murmur when I examined her a month before she died. This was caused not by mitral stenosis but was due undoubtedly to marked dilatation of the left ventricle. It is a very instructive case.

DR. HIGGINS: Do you think the aortic endocarditis was chronic, or was it wholly acute?

DR. MALLORY: Certainly there could have been no chronic insufficiency.

DR. MARGARET E. MORIARTY: About the twenty-eighth of April previous to her downhill course the child had a very definite clinical upset which may have coincided with this acute process.

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BOSTON'S NOISE PROBLEMS

IN 1931 in response to the wishes of physicians and lay groups in Boston, His Honor, Mayor James M. Curley, appointed the Boston Noise Commission to work in coöperation with the City Planning Board for the purpose of devising some way of suppressing, if possible, unnecessary noises in this city.

The composition of this Commission was the result of nominations by medical organizations and civic and professional groups who were interested in the subject. Twenty representatives of educational, business, civic, social and scientific organizations composed the commission and Dr. Henry A. Christian was elected chairman. The City Planning Board participated in the meetings of the Commission and concurred in its conclusions and recommendations.

The work of the Commission was concluded on June 24, 1932 as appears in a letter to Mayor Curley written by Dr. Henry A. Christian, Chairman, which was supplemented by a report of the City Planning Board July 15, 1932.

While in a general way people understand that noise is irritating and may have an effect on their health, few, we believe, are aware of the variety of noises which should be abated or modified and the definite effect of these disturbing factors on the well-being of the inhabitants of the city.

There is probably a general appreciation of the shock to the nervous system of loud and unexpected noises, but it is likely that only the well-informed know of the degree of the steadily increasing effect of noise on the health of the people in a large city, although some individuals are exasperated by night noises such as locomotives or even milkmen, while others are reacting more especially to the day traffic on the streets or the raucous horn or strident riveting mechanism. The Commission sets forth that noise has a detrimental effect on working people as shown by decreased output, more errors, mistakes and accidents, the latter especially among those who are about moving machinery. As a definite health problem, noisy surroundings increase the strain and fatigue of workers and contribute to lowered efficiency and shorter life. Comparatively minor effects of volume and high pitched noise affect hearing which may tend to deafness and this in turn contributes to strain. Night noises are especially detrimental when they prevent sleep.

Statistics show a rise in mortality rates from degenerative diseases among those engaged in noisy occupations. In the report a tabulation of about forty objectionable, and to a considerable degree preventable, noises is presented and these are classified as to time of day, whether continuous, general, or local, and ways for measuring their intensity and loudness are explained.

Interesting studies in New York and Boston have been made which show the relative effects of noise, and the several ordinances relating to this subject are presented with important suggestions as to abatements of these nuisances. This report should be carefully read by all public-spirited citizens of Boston because it is a contribution to the city health problems. Copies may be obtained at 30 City Hall, Boston.

In this matter, as in the case of the smoke nuisance, the difficulty respecting better conditions lies in the indifference of the people. Public officials have so many duties that, unless there is a definite urge by the electorate, such matters give way to more spectacular demands.

Boston should set the pace for other cities. The subject is worthy of attention and action.

A COMMENDABLE ACTION

A SOMEWHAT unexpected action by a sufficient number of states in ratification of the League of Nations convention on narcotics is encouraging.

Until recently only nine countries of the necessary twenty-five had ratified the Drug Limitation Treaty. The requisite number has now acted favorably and this is a triumph both for the League and the United States. Nearly fourteen years ago the members of the League agreed to confer general supervision over agreements relating to traffic in opium and other dangerous drugs.

In commenting on the situation, the *New York Times* states in its issue of April 14 as follows:

"In permitting an international board to pass on the domestic medicinal and scientific needs of every country and to limit the right of manufacture to the determined maximum of the needs of each, it offers a signal precedent that had its first support from the United States Senate.

"The treaty provides for yearly estimates of each country's legitimate requirements, to be examined and passed upon by the central international supervisory body. The manufacturing countries agree to limit raw materials to the totals required for meeting the approved estimates. It is believed that this is the most effective way of reducing the production of the raw materials. If more than certain amounts of drug-producing plants required for benign uses cannot be manufactured, they will not be grown. It is particularly gratifying that Turkey, once the worst offender, has been among the first to give practical coöperation."

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

MINOT, GEORGE R. A.B., S.D. (Hon. Harv.), F.R.C.P. (Hon. Edin.) M.D. Harvard University Medical School 1912. Professor of Medicine, Harvard University. Director, Thorndike Memorial Laboratory. Visiting Physician, Second and Fourth Medical Services (Harvard), Boston City Hospital. Member, Board of Consultation, Massachusetts General Hospital. Consulting Physician, Peter Bent Brigham and Beth Israel Hospitals. His subject is "General Aspects of the Treatment of Chronic Arthritis." Page 1285. Address: Thorndike Memorial Laboratory, Boston City Hospital, Boston.

FALLON, MICHAEL F. A.B., LL.D., M.D. Harvard University Medical School 1887. F.A.C.S. Surgeon-in-Chief, St. Vincent Hospital, Worcester. His subject is "Intrahepatic Cholelithiasis." Page 1291. Address: 390 Main Street, Worcester, Mass.

HARTSHORN, WILLIS E. Ph.B., M.D. University of Minnesota Medical School 1898. F.A.C.S. Clinical Professor of Surgery, Yale University School of Medicine. Attending Surgeon, New Haven Hospital. Consulting Surgeon, Griffin Hospital, Derby, and Grace Hospital, New Haven. Chief of Staff, Surgical Clinic, New Haven Dispensary. His subject is "Recurrent or Intermittent Jaundice in Youth." Page 1294. Address: 67 Trumbull Street, New Haven, Connecticut.

STETSON, HALBERT G. M.D. University of Maryland School of Medicine and College of Physicians and Surgeons, 1896. F.A.C.S. President Massachusetts Medical Society 1931-1933. Surgeon, Franklin County Public Hospital. His subject is "The President's Address." Page 1300. Address: 39 Federal Street, Greenfield, Mass.

LEHNHERR, EARL R. A.B., M.A., M.D. Harvard University Medical School 1931. Instructor in Biochemistry, University of Kansas, 1925-1928. Formerly House Officer New England Deaconess Hospital where this work was done. House Officer, Fifth Medical Service, Boston City Hospital. His subject is "Arteriosclerosis and Diabetes Mellitus." Page 1307. Address: 441 Marlborough Street, Boston.

BIGELOW, GEORGE H. A.B., M.D. Harvard University Medical School 1916. Commissioner of Public Health for Massachusetts. Address: State House, Boston. Associated with him is

HAMBLEN, ANGELINE D. A.B. Statistician, Massachusetts Department of Public Health. Address: 546 State House, Boston. Their subject is "What Are Death Rates in Massachusetts Doing?" Page 1313.

BOSTON MEDICAL LIBRARY

AN ACCOUNT BOOK OF DR. BENJAMIN GOTT OF MARLBORO, MASS. (1729)

AN interesting day book or journal, a combination of charge accounts and record of treatments prescribed and medicines dispensed at current prices, has recently come into the possession of the Library. It covers the period from February 1728 to January 1747 and belonged to Dr. Benjamin Gott of Marlboro, Mass., whose patients resided in Worcester, Shrewsbury, Northboro, Westboro, Hopkinton, Bolton, Grafton, Mendon, Southboro, Stow, Rutland, Sudbury, Framingham, Littleton, Sutton, Uxbridge and Springfield, where he records the fact that he was called to a clergyman with whom he "tarried four days," and was paid seven pounds in which was included the cost of a few drugs. In reading these entries a number of matters are worthy of note. In the first place it is quite apparent that the practice in Marlboro must have been largely in his own hands and he was

probably personally acquainted with all the residents of the town for though there are a large number of entries in this book, the number that have any address allotted to them were represented by the list of towns given above, except that some of these places had contributed more than a single case. The name of the town of Marlboro as the residence of a patient appears only once. Days of the month as units of time-measure did not often figure in these records. Even the first entry rarely has a day assigned to it, only the month and year, even in accounts covering a period of years. On the other hand the date of settlement of accounts is almost invariably under a date which includes the day of the month and the year. Rarely were bills settled by partial payments on account. When the debtor was ready to make settlement it was in full of the amount, though the bill might have been running for from one to six or eight years. The number of accounts that were closed within the year that they were entered in the book were extremely few. In the rare cases where part payment was made on an account, it was usually in the form of some service rendered or commodity tendered. "Work in the hay field," "pasturing my horse," "setting fence posts," "potatoes," etc., were credited against the account at the current rates of wages or commodity prices. Occasionally he accepted a note in payment of indebtedness and when such was the case he specified that the note was to be cancelled in "lawful money." In entering the charges the head of the family was the one to whom he looked for remuneration and the individual treated was designated by "your wife", "your son", "your daughter", "your children", "your man", or "yourself". It was apparently customary for employers to settle the bills of those in their service who were ill or injured but whether such amounts were deducted from their wages does not, of course, appear from such a record as this. It does appear, however, that in those days, the physician attending an employee received compensation at the same rates and with equal promptitude as he did from the employer for his own personal medical attendance, which would seem to indicate that the physician fared better before the days of the Industrial Accident Boards than he has since. Rarely is it possible to do anything more than infer for what the patient was treated. Such indefinite entries as "for your thumb", "for your legs," "opening your wife's breast", "dressings", or the more definite statement "pulling a tooth" or "for your wife in travail", were the records most commonly made when it was a surgical or obstetrical service that was rendered. Apparently when he was called for the various medical conditions which arose, the drugs prescribed constituted a sufficiently clear record of what it was for which he prescribed. Every remedy ordered was entered and a price which was in addition to the "visit". Bleeding, which was frequently resorted to, was designated as "blood" and was performed at a fairly uniform rate of two shillings. All accounts were rendered in pounds, shillings and pence. He indicated the number of "dressings" an individual case required by a series of straight marks. A difference was made in the price of day and night visits and an extra charge was made for out-of-town calls, though just where the limits of local calls were set it would be difficult to say.

When drugs were dispensed in "vials" a charge was made for the container which was credited on the bill when returned. Also it was his custom to give credit for unused drugs, returned.

He must have had a rather imposing pharmacy for the variety of remedies he employed included a vastly greater number than any practitioner uses now or even knows about, and to have carried them about for house-to-house dispensing must have required rather voluminous saddlebags. To one of his patients, and he was an employee of the man to whom the charge was made, he prescribed a "barril of cyder," at 20 shillings.

Treacle, antimony, rhubarb, fever drops and fever powders, purge, chalybeates, bitters, tragacanth, blisters, emplastra of various sorts, Sp'ts. Vini and a great number of others were the drugs he commonly prescribed and it is probable that a careful comparison of the records of the patients treated, together with an analysis of the remedies suggested would give a fair basis for inference of what constituted the general run of the practice of that day. Such a survey must needs be deferred but for those interested in getting a glimpse of the way in which a practitioner in the early eighteenth century occupied his time, the record is an interesting one and is older than any of that nature that have found their way to this Library. The names of the patients are also interesting as a reflection of the old New England stock who were settled in the colony at that period.

MISCELLANY

A RADIO MESSAGE PREPARED AND SPONSORED BY THE COMMITTEE ON PUBLIC EDUCATION OF THE MASSACHUSETTS MEDICAL SOCIETY FOR THE DEPARTMENT OF PUBLIC HEALTH

NEURASTHENIA*

BY M. A. BARTON, M.D.

I was recently asked by a representative of an insurance company, "What is neurasthenia?"

I suppose he had reference to the type of neurasthenia with which insurance companies generally have to deal, that which may follow physical injury. While this type presents a rather difficult problem from the viewpoint of industrial insurance,

*May 30, 1933, Station WBZ, 4:30 P.M.

it is only one of a number which may complicate the social and economic life of certain people.

The average person, hearing that someone or other has neurasthenia, pictures a malingerer, perhaps; one who is playing at being ill. This may not be so, as I shall try to point out.

The word neurasthenia is a rather confusing one. It is commonly employed both by the medical profession and the public, and with many different meanings.

The word neurasthenia should mean nerve exhaustion; what is commonly called "nervous prostration" or "nervous debility". It is a condition in which there is a more or less marked lack of nervous energy, and usually an increase in reaction —both mental and physical—to external impressions.

It has been aptly described as consisting "essentially in an exaggerated susceptibility to bodily impressions and false reasoning thereon".

We are all born with certain predispositions. A lack of nervous stamina, or an increasing load of the stresses of life on a person whose nervous stamina is distinctly limited, give the background for the development of neurasthenia. It is the people who are born with this sort of disposition who suffer most from so-called emotional shocks, excessive use of alcohol, neurotic temperament, chronic constipation, or whatever circumstances or symptoms may associate themselves with their nervous instability.

A man troubled with neurasthenia complains of a more or less indefinite chain of symptoms. He will describe his condition to the doctor something like this: "I am nervous. I cannot seem to do as much work as I formerly did. I am easily confused, and I am easily excited and irritated." Sometimes the doctor will be told of loss and disturbance of sleep, and of frequent unpleasant dreams. Indigestion and palpitation of the heart may be complained of. Sometimes there is a feeling of pressure on the head; sometimes sexual disorders. Irritability and inability to concentrate the thoughts are among the earliest manifestations. Any effort to concentrate usually results in restlessness, headache, dizziness and a feeling of depression.

When the doctor examines the patient suffering with neurasthenia he will find, in many cases, general muscular weakness. The patient admits that he tires easily after any physical exertion. He cannot walk so far as formerly. Exertion brings on dizziness. Dull aches and pains in various parts of the body are complained of. Headache is frequent, and with the headache of neurasthenia there is sometimes a feeling as if a tight band were about the head.

Not infrequently there are experienced feelings of numbness, tingling and sensations of heat and cold, and these hot and cold flashes may be followed by a slight sweating. Sometimes disturbances of sight occur.

Neurasthenics frequently suffer from causeless fear. They continually watch for new symptoms and at the same time exaggerate the old ones. Sometimes this fear is purely imaginary. At times there may be present fear of darkness or storms, or fear of closed places (claustrophobia), or fear of open spaces (agarophobia), or fear of being alone (monophobia). It must not be understood from this, however, that the different fears I have just spoken of constitute a basis for a diagnosis of neurasthenia. I merely say that sometimes they are present.

Neurasthenia frequently is confused with psychoneurosis, hysteria, goitre and melancholia, and in rare cases with early symptoms of certain types of insanity. In young people, particularly at the age of puberty, mental instability may lead to symptoms of neurasthenia.

We must bear in mind that there exists a distinct difference between the symptoms of neurasthenia and those of the trouble which appears to be so much like it. Any confusion which is apt to arise may be quite easily understood, as in psychoneurosis and hysteria, the two diseases which resemble it more closely than any of the others, as well as in the other diseases I mentioned, we have, apparently, similar sets of symptoms and similar complaints. These, however, are only superficially like those of neurasthenia.

Another condition with which neurasthenia may be confused is hypochondriasis. The hypochondriac, or one who has hypochondriasis, may be extremely depressed and may entertain a morbid anxiety regarding his health, but, when examined will show no existing physical reason for his complaints. It occasionally occurs that a neurasthenic becomes hypochondriacal.

The comparison with hysteria is especially interesting.

Neurasthenia occurs more frequently in males; while hysteria occurs more often in females. The neurasthenic is apt to be addicted to hard work; while hysteria is often seen in the indolent. The person suffering with neurasthenia does not want sympathy; the one with hysteria craves it. The neurasthenic may show signs of wasting; the hysterical patient will show signs of being well nourished and is frequently plump, or even fat.

Hysterical people do not readily respond to treatment, but we do find that, although neurasthenia may be a long-drawn-out affair, although it is a stubborn chronic disease, and may last for years, much can be done for it. When a neurasthenic person becomes aware of his own limitations, and lives and works and plays within them, recovery may occur. We cannot afford to forget, though, that any undue strain is apt to produce a relapse.

Properly prescribed rest is always of great value in the treatment and is usually the first consideration. At times it may be necessary to have a complete change of scene or climate, or a sea voyage

may be beneficial. Again, physiotherapy in one form or another may be employed, and this is sometimes used in the neurasthenia associated with physical injury or emotional shock. Or again, different drugs may be necessary. The treatment varies somewhat with each case.

When a patient presents himself in a doctor's consulting room with symptoms of neurasthenia there is no implication of a mental "twist". Neither is he to be considered a shirker.

Neurasthenia cannot be simply dismissed as a symptom of some other trouble, but is a definite disease. It must be recognized and treated as such. There are no stigmata attached to it. It may be superimposed upon or follow some other disease. An understanding of the individual's problems and limitations may lead him toward, and often to, complete recovery.

AN HONOR CONFERRED ON DR. JOSLIN

Dr. Elliott P. Joslin was awarded a gold medal for an exhibition of diabetic cases at the meeting of the American Medical Association, Milwaukee, this month.

THE ELECTION OF DR. WALTER L. BIERRING

The American Medical Association has conferred the honor of President-Elect on Dr. Walter Lawrence Bierring of Des Moines, Iowa.

Dr. Bierring was born in 1868 and is a graduate of the State University of Iowa College of Medicine. He has practiced internal medicine and is recognized as one of the leading physicians of the Middle West. He has recently been appointed as State Commissioner of Health of Iowa.

He has been active in the affairs of the American Medical Association and for many years was the guiding spirit in the Federation of State Examining Boards. His election will be endorsed by physicians throughout the country.

COLONEL NORTHINGTON A MARTYR TO SCIENCE

Colonel Eugene Northington, U. S. Army Medical Corps, died at the Army General Hospital in San Francisco, June 10, 1933, at the age of 53. He began employing the x-ray experiments in Army Service before the dangers incident to this work were recognized, and even after the evidence of the development of cancer in his limbs, like many others, he continued his work knowing full well the consequences. He was subjected to nearly two hundred operations in efforts to control the malignant growths, according to a report in the *New York Times*, but persisted in the use of the x-ray because he hoped that his case would be a warning to others. Thus do scientists defy death in their devotion to duty.

Dr. Northington was born in Alabama and was graduated from Tulane Medical School in 1903 and the Army Medical School in 1911.

COMPENSATORY FEATURES OF THE DEPRESSION

In an interview with a newspaper reporter, Dr. Dwight O'Hara, Chairman of the Committee on Public Health of the Massachusetts Medical Society, expressed his conviction that the present depression is probably associated with better general health than any preceding similar period. This he believes is due to more widespread practice of hygiene and sanitation and the governmental supervision maintained over food, milk and water supplies. It is shown in one way by the average life span of a child born in 1900 of 47 years as compared with the life expectancy of a child born in 1930 of 60 years.

RESOLUTIONS ADOPTED BY THE SOCIETY OF PLASTIC AND RECONSTRUCTIVE SURGERY, 1125 PARK AVENUE, NEW YORK CITY

The following resolutions condemning sensational presentations of plastic surgery by irresponsible and non-representative individuals and groups were adopted by the Society of Plastic and Reconstructive Surgery at its stated meeting at the New York Academy of Medicine on May 26:

"Whereas, sensational stories frequently appear in lay publications concerning the cosmetic repair of the face and body with special reference to the correction of nasal malformations and the eradication of the stigma of age; and

"Whereas, these stories convey the erroneous impression that plastic surgery is purely for cosmetic purposes and involves procedures that may safely be performed by lay cosmeticians in an environment that does not provide the strict asepsis and other safeguards of a hospital operating room; and

"Whereas, these stories are designed to appeal to, and promote the exploitation of, unstable and often psychopathic individuals who have no genuine deformity but are overly sensitive to negligible imperfections and the changes wrought by age,

"Therefore Be It Resolved, That the Society of Plastic and Reconstructive Surgery takes steps to inform the public

(1) that plastic surgery is a regular surgical specialty, embracing the reconstruction of defects and malformations that interfere with normal function as well as the repair of gross cosmetic deformities;

(2) that those engaged in the practice of Plastic and Reconstructive Surgery require the same scientific and technical training as the practitioners of any other surgical specialty and are bound by the same ethics, adopted in the interests of the public, that govern all reputable physicians, and

(3) that the safe performance of even minor plastic and reconstructive procedures demands the precautions and safeguards of a first grade operating room;

"And Be It Further Resolved, That this Society

condemns the performance of any plastic operations whatsoever by lay cosmeticians and the use of beauty shops, hotel suites and convention halls for this purpose;

"And Be It Further Resolved, That this Society warns the public of the dangers of any surgery at unqualified hands and the unreliability of sensational, self-aggrandizing publicity;

"And Be It Further Resolved, That this Society urges the community to recognize the social aspects of plastic and reconstructive surgery and make it available, at competent hands, to the poor as well as the rich in cases where cosmetic or functional repair is genuinely indicated."

PROVISIONAL FIGURES FOR LIVE BIRTHS, INFANT MORTALITY, AND STILLBIRTHS IN THE BIRTH REGISTRATION AREA (EXCLUSIVE OF MASSACHUSETTS AND UTAH) IN CONTINENTAL UNITED STATES: 1932

The Bureau of the Census announces that in the birth registration area of continental United States (exclusive of Massachusetts and Utah) during the calendar year 1932 there were 1,961,618 births, 113,661 deaths of infants under one year of age, and 75,175 stillbirths. These figures are equivalent to a birth rate of 17.3 per 1,000 population, an infant mortality rate of 57.9 per 1,000 live births, and a stillbirth rate of 3.8 per 100 live births. The corresponding final rates for 1931 for the same area were 18.0, 61.9, and 3.8, respectively.

The birth rate of 17.3 for the 44 states and the District of Columbia covered by this press release is the lowest since the establishment of the Federal birth registration area in 1915. The infant mortality rate (57.9) is also lower than for any previous year. The stillbirth rate (3.8) is the same as for 1931 and has varied but very little since 1922, in which year the annual collection of stillbirth records was begun.

The urban part of the birth registration area of 1932, except Massachusetts and Utah, includes 864 cities, towns, and townships, with an estimated total population of 54,979,000 on July 1, 1932. In this urban area there were 896,334 births, 51,136 deaths of infants under one year of age, and 35,317 stillbirths. The rural part had an estimated population of 58,367,000, among which there were 1,065,284 births, 62,525 infant deaths, and 39,858 stillbirths. In the urban portion of the area the birth rate was 16.3 per 1,000 population, the infant mortality rate 57.1 per 1,000 live births, and the stillbirth rate 3.9 per 100 live births. The corresponding rates for the rural portion of the area were 18.3, 58.7, and 3.7, respectively.

Naturally, the greatest number of births occurred in the four most populous states—New York, having 198,353, Pennsylvania 168,533, Illinois, 111,512, and Ohio, 101,043. The highest birth rates, however, were for New Mexico, 28.0, North and South Carolina, each 23.7, and Alabama, 23.5. Nevada, Wyoming, and Delaware had the smallest number of births, 1,244, 4,231, and 4,264, respectively, but the states having the lowest birth rates were California and Oregon each with 13.1, Nevada and Washington, each with 13.4, and Illinois, with a rate of 14.4.

The greatest number of deaths of infants under one year of age occurred in New York (10,446), Pennsylvania (10,107), and Ohio (5,961). The highest infant mortality rate was for New Mexico (113.6), which was the only state with a rate higher than 100.0. Other states with high infant mortality rates were Arizona, Colorado, District of Columbia, South Carolina, and West Virginia.

There is no single definition of stillbirths in general use among the states nor is the term "stillbirth" used in the same sense in the various states. Therefore, the interpretation of the statistics should be made with extreme caution as their registration is made upon a different basis.—*Department of Commerce, Bureau of the Census, Washington.*

OPENING OF THE NEW BUILDING AT THE BOSTON STATE HOSPITAL

The new building at the Boston State Hospital was opened June 15 and is designated as the Psychiatric Clinic of the Boston State Hospital. It has facilities for one hundred and fifty patients. This building was designed by Dr. J. M. May, Massachusetts Commissioner of Mental Diseases, who was Superintendent of the Boston State Hospital for many years before his appointment to his present position. This addition is designed to treat the curable types of mental illness and these patients will be separated from the chronic cases. Especial arrangements provide for opportunities for friends to visit these patients in private and without restraint. Every facility for early recovery is incorporated in the equipment and plans of the building. Food will be served in a cafeteria.

OBITUARY

RESOLUTIONS ON THE DEATH OF DR. ARTHUR LINWOOD BROWN

Resolved that in the passing of our late colleague, Dr. Arthur Linwood Brown, the New England Physical Therapy Society has lost a member whose interest, study and practice of the subjects in which our organization is particularly concerned, characterized him as one of its outstanding fellows.

Dr. Brown was a skillful surgeon; he was, also, endowed with research capacity which enabled him to contribute much to the scientific knowledge of physical therapy. As a practitioner he was absolutely devoted to the welfare and progress of his patients. He was interested in all that pertains to properly organized effort in medical matters, and

he possessed genial fun-loving qualities which endeared him to all of his associates.

His personal charm and tact, and his profound knowledge of physical therapy and its scientific application made him an admirable representative of the various groups organized for its study. He was elected to many offices of responsibility, having served as President of the American Electrotherapeutic Association, chairman of various committees and as delegate to foreign conferences. He was a charter member of the Academy of Physical Medicine. His instructive writings along the lines of his original research have been many and varied. In these and in other ways he had aided materially in the development of this special field of medical practice.

His loss will be keenly felt in medical circles, among his fraternal affiliations, and by the citizens of the community he so well served.

To his bereaved family, we extend our sincerest sympathy.

Resolved that a copy of these resolutions be sent to his immediate family, to the *New England Journal of Medicine*, and that a copy be spread upon the records of the New England Physical Therapy Society.

WILLIAM D. MCFEE,
Committee on Resolutions,
New England Physical Therapy Society.

NOTICES

ASSIGNMENT OF JAMES EWING

Consultant James Ewing. Requested to proceed from New York, N. Y., to Boston, Mass., for conference regarding field investigations of cancer; then if possible to proceed to Washington, D. C., and return to New York, for conference with the Surgeon General regarding field investigations of cancer. May 31, 1933. *U. S. P. H. Service.*

ASSIGNMENT OF DR. WICKMAN

Assistant Surgeon W. J. A. Wickman has been relieved from duty at Pittsburgh, Pa., and assigned to duty at Marine Hospital, Boston, Mass. June 3, 1933. *U. S. P. H. Service.*

RADIO HEALTH MESSAGES

JUNE, 1933

Sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

Courtesy WBZ. Tuesdays, 4:30 P.M.

June

27 Social Service in Public Health

STATE HOUSE BROADCAST

Sponsored by the Massachusetts Department of Public Health.

Courtesy WEEI. Fridays, 12:45 P.M.

Health Subjects of Public Interest discussed by the Division Directors of the Department.

RADIO HEALTH FORUM

Queries from the public are answered under the sponsorship of the Department of Public Health.

Courtesy WEEI. Fridays, 4:50 P.M.

Questions on Health and Prevention of Disease may be sent to Radio Health Forum, State Department of Public Health, State House, Boston.

REPORT OF MEETING

NEW ENGLAND MEDICAL SOCIETY

MAY MEETING

The one hundred and eighteenth meeting of the New England Medical Society was held in the Evans auditorium of the Massachusetts Memorial Hospitals on Wednesday, May 17, at 8 P.M. The speaker of the evening was Dr. Albert A. Berg of the Mount Sinai Hospital in New York City. His subject was "Subtotal Gastrectomy for Radical Cure of Gastric and Duodenal Ulcer with a Consideration of Its Late Physiological and Chemical Results."

Dr. Berg introduced his subject by a clear exposition of his views on the etiology of peptic ulcer. The ulcer is a mere localized manifestation of a more generalized disease process involving the duodenum, the entire antrum of the stomach, and part of the fundus, the latter especially in gastric ulcer. Accepting these views, it becomes clear that excision of the ulcer, gastro-enterostomy, or pyloroplasty are mere palliative and empirical procedures. In no sense can any such operation be looked upon as curative.

Three conditions are essential for the production of peptic ulcer: (1) gastritis or duodenitis, (2) change in the secretion of free hydrochloric acid, and (3) infection. In stomachs examined half an hour postmortem, a chronic gastritis and duodenitis can always be demonstrated in association with ulcer. The cause of the gastritis is not yet known; but ulcer does not occur in its absence. Cushing has recently suggested a close relationship between the hypothalamus and the gastric mucosa. Hypothalamic lesions may influence the mucosa of the stomach and duodenum by way of the vagus nerve. Whether the pituitary gland may play a significant rôle remains to be seen.

The physiology of gastric secretion was discussed in some detail. Of the various substances secreted the most important is the hydrochloric acid relative to peptic ulcer. There are four phases in gastric secretion: (1) the continuous or "tone" secretion, (2) the primary secretion (vagus); (3)

the secondary secretion (gastric); and (4) the intestinal secretion. The latter two are under hormonal regulation. The tone secretion is an individual characteristic and varies from person to person. It can be measured by analysis of the fasting gastric contents and can be checked by repeated Rehfuss tube samples overnight. The quality of the gastric juice is essentially constant for a given individual. The quantity and rate of secretion, however, vary within wide limits. In general, both free and total acidity are lower in gastric than in duodenal ulcer. Because of the constant and continuous nature of the "tone" secretion, it plays a large part in the maintenance of acidity in the stomach.

Dr. Berg emphasized the importance of the psychic element in the secretion of hydrochloric acid in the stomach. This influence on the activity of the stomach is exerted through the vagus nerves, the gastric distribution of which he described with some detail. The antral hormones are responsible only for the secondary gastric secretion. The acidity of the stomach contents thus depends on the tone secretion, the vagus secretion, and the antrum hormone secretion. The value of the subtotal gastrectomy lies in its effective lowering of the quantity and rate of gastric secretion.

Infection does not play a primary rôle in the etiology of peptic ulcer. While it does not produce ulcer, however, it is responsible for the cyclic course of remission and exacerbation. Infection leads to exacerbation; subsidence of the infection leads to remission, much as an attack of tonsillitis. The gastritis and excessive secretion are directly dealt with surgically. It is obvious that gastric secretion cannot be affected by any of the older operations including local excision of the ulcer with or without gastro-enterostomy, gastro-enterostomy with or without pyloric exclusion, the Halstead pyloroplasty, and the Finney-Halstead pyloroplasty. The first operations to affect the secretory physiology of the stomach were those of sleeve resection and subtotal gastrectomy. In either case the amount of secreting mucosa is diminished and diseased tissue is removed, especially in the latter.

In a series of lantern slides, Dr. Berg presented the results of subtotal gastrectomy at the Mount Sinai Hospital since 1924. In all cases, of course, medical treatment had been tried with failure for at least one year. There was a marked postoperative reduction in the acidity of the gastric contents, an actual anacidity being found in over 60 per cent of the cases. In a large number of cases of duodenal ulcer there were only 2.7 per cent of known recurrences. There were no recurrences in the cases of gastric ulcer treated by subtotal gastrectomy. In seventeen cases of duodenal ulcer with a very high hyperacidity, 90 to 120 units of free hydrochloric acid, left vagus section was added to subtotal gastrectomy. Among these there were no recurrences.

The mortality from the operation is reported in Dr. Berg's own words: "The mortality attendant upon primary subtotal gastrectomy for duodenal and gastric ulcer in our series of 322 cases was 29 deaths; duodenal 260 with 20 deaths; gastric 62 with 9 deaths; 9.1 per cent. I have included in this compilation all cases that have been operated upon in the Service; acute massive bleeding cases as well as slow bleeding cases, acute perforated ulceration, patients with disturbances of metabolism, heart, lungs, cardiovascular lesions and blood lesions, such as polycythemia, purpura hemorrhagica, etc. I feel that it is fair to give this total percentage in all the cases of the service in which a primary subtotal gastrectomy was done, even though the operation was performed by various operators. In going over the deaths in this series, however, we find that two patients were moribund from acute hemorrhage when put on the operating table, operation being undertaken as a 'dernier ressort' to save a hopeless patient; one died of heat stroke with hyperpyrexia; one patient with preoperative polycythemia and thrombosis died immediately after the operation from operative shock; a case of cerebral embolism ten days postoperative in a very old emaciated woman with hypertension (220) in whom a preoperative diagnosis of carcinoma of the stomach was made, and a case of pulmonary embolism occurring in the third week postoperative when the patient was about to go home.

"If we exclude from the mortality records the cases moribund at time of operation, which latter were operated upon only because of extreme lifesaving indications, and they probably do not come under consideration, the mortality falls to 7.7 per cent. As a matter of fact the mortality attendant upon primary subtotal gastrectomy for gastric and duodenal ulcer can be made as low as the operator wishes. If the operator wishes to take only those patients who are in fairly good condition with fair hearts, lungs, kidneys, and blood, the mortality could be reduced to 2 per cent. Three deaths in our series of cases were due to duodenal leak, and two deaths to peritonitis without demonstrable cause, infection occurring on the operating table. The majority of our deaths have occurred from pulmonary complications. About three have died from acute necrosis of the colon (unexplained), and several have died from acute gangrenous gastritis, distant from the suture line.

"The mortality differs in different years. Thus from 1924 to 1930 inclusive, there were 265 primary subtotal gastrectomies for gastric and duodenal ulcers with 17 deaths, a percentage of 6.4. These mortality figures compare favorably with those published by other authors on gastro-enterostomy and excision of ulcers, etc.

"In Lewisohn's cases published in 1924, 213 various operations, gastro-enterostomy, local excision, local excision plus gastro-enterostomy, partial or

subtotal gastrectomy, sleeve resection, etc., there were 22 deaths or 10.3 per cent mortality.

The discussion was opened by Dr. Lincoln Davis of Boston. He expressed hesitation in spreading the doctrine of subtotal gastrectomy among the general surgeons, because, whereas the mortality in the hands of Dr. Berg is remarkably low, it would be multiplied many times by the ordinary surgeon. It would be safer for the latter to do the ordinary gastro-enterostomy, reserving the more radical measures in cases of suspected or proved malignancy.

The discussion was continued by other members of the society including Drs. Jordan, Howard, Marsh, Walker, and McClure. Dr. Berg closed the discussion by answering a number of questions and again stressing the need for surgeons to be conservative in dealing with peptic ulcer. In all cases, an adequate medical treatment should be given fair trial.

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

June 29 to July 3—Third International Hospital Association. See page 811, issue of April 13.

July 24-31—The IVth International Congress of Radiology. See page 1071, issue of May 18.

August 10, 11, 12—American Delegation to the International Goiter Conference. See page 768, issue of April 6.

August 13-27—Courses at the Tomarkin Foundation. See page 1070, issue of May 18.

September 25-30—The American Congress of Radiology. See page 1224, issue of June 8.

September 29 and 30—New England Surgical Society. See notice on page 1232, issue of June 8.

October 9-12—American Public Health Association. See page 1175, issue of June 1.

October 23 - November 3—The 1933 Graduate Fortnight of the New York Academy of Medicine. See page 1071, issue of May 18.

April 16-20, 1934—The American College of Physicians. See notice on page 970, issue of May 4.

BOOK REVIEWS

Surgical Clinics of North America. Volume 13, Number 1, February, 1933. Pacific Coast Surgical Association Number. W. B. Saunders Company, Philadelphia.

Fairchild of Woodland graphically illustrates the increase in surgical mortality in patients past middle age. In a series of 1476 cases using age 40 as the dividing line the comparative mortality rates were as follows: biliary tract 2.6% and 10.5%; acute appendicitis 1.4% and 14.5%; peptic ulcer 6.7% and 11.8% and female pelvis 0.8% and 8%. The obvious conclusion is that surgeons should be more conservative in estimating the operative risk in older patients.

Hinman of the University of California reports the successful local use of bacteriophage in urinary infections. He also presents a case of prostatectomy in a hemophiliac where bleeding was controlled by fulguration and twelve transfusions were given.

A case of partial pancreatectomy for hyperinsulism is described by Holman of Stanford University. A man 31 years old had repeated attacks of faintness progressing to the stage of convulsions and relieved by food. During an attack his blood sugar dropped to 38 mg. per 100 cc. His basal metabolic rate was —20. A section of his pancreas about 8 cm. long was excised and during convalescence more of it sloughed out. Following operation he was improved, although the fasting blood sugar dropped from the immediate postoperative finding of 450 mg. to a level of 50 mg. He believes that more of the pancreas, probably three-fourths, should be removed. To avoid technical difficulties he suggests removing the spleen also.

Joyce of Portland presents a case of chordoma of the second and third cervical vertebrae. This rare tumor developing from the rests of the notochord usually occurs at its extremities, i.e., at the spheno-occipital synchondrosis or in the sacro-coccygeal region. Trauma may apparently be an etiological factor. The symptoms are those of cord pressure. Relief is obtained by surgical removal, but it tends to recur locally, although it rarely metastasizes.

Mason and Baker of Seattle describe a simplified technic for choledochoduodenostomy in which the common duct is stitched to the duodenum, a window cut in each, and a T tube inserted which acts as a guide and handle for convenience in making the anastomosis. The long arm of the tube is then cut off and the closure completed over the short tube.

Reichert of Stanford University discusses glossopharyngeal neuralgia and presents three cases cured by intracranial section of the nerve. The diagnosis is made on the history of recurring attacks of lancinating pain deep in the tonsillar region, not involving the skin of the face, often radiating to the maxilla or ear, accompanied by salivation, and induced by eating, talking or swallowing. Cocainization of the tonsillar region and base of the tongue stops the pain. Peripheral division of the nerve has not proved satisfactory. Permanent cure is obtained by intracranial section. Through a posterior approach the ninth nerve is exposed and avulsed. The resulting anesthesia involves the nasopharynx from the eustachian tube to the epiglottis, laterally to the anterior pillar of the tonsil, half of the soft palate and uvula and the posterior third of the tongue. This area shows loss of taste.

This issue also includes thirty-four other clinics discussing many problems of practical interest.

The Surgical Clinics of North America. Volume 12, Number 6. December, 1932. Philadelphia Number. W. B. Saunders Company, Philadelphia.

The outstanding clinic in this issue is that of W. Wayne Babcock. He reports a case in which a large deeply placed parathyroid tumor was apparently the cause of multiple giant-cell tumors of bone, osteitis fibrosa cystica, Paget's type of dis-

ease of the skull and renal calculi. He outlines the difficult technic of locating the parathyroids and emphasizes the importance of giving parathormone promptly after operation. A description is given of a case of malignant endocarditis that was treated by cauterization of the pectoral muscle as advocated by Bier.

He uses the perineal anus in his one-stage radical resection for carcinoma of the rectum and considers the results as good and the patients much more satisfied than with an abdominal colostomy.

In a case of multiple abdominal fistulae following operations for intestinal tuberculosis he eliminated the colon by a novel method of perineal ileostomy. The divided ileum was buried in the retrorectal pouch, delivered through the perineum and drawn through a buttonhole in the rectal wall. A case of recurrent echinococcus cyst of the abdomen was apparently cured by the use of neosalvarsan.

Carnett and Bates give an excellent discussion of the condition known as railway spine. They believe that the symptoms are due to pressure on the nerves near the intervertebral foramina.

Eliason discusses the surgical significance of gastro-intestinal hemorrhage and emphasizes the need of thorough study of all such cases.

For the repair of large inguinal hernia especially of the direct or recurrent types, Thomas uses a common wire nail to anchor the intact rectus muscle and sheath to the pelvis. He reports eight cases without recurrence.

Billings reports four cases of pericardiotomy for suppurative pericarditis with three recoveries and one death from meningitis.

Wright discusses infections in the dangerous circle of the face. He believes in radical, high frequency current excision of carbuncles. He uses the cautery to block the angular vein and thus prevent septic thrombosis of the cavernous sinus.

The technic of phrenic neurectomy is very clearly illustrated by Willauer.

These, with clinics on fractures and reports of unusual cases, combine to make this a very interesting number.

Pathologie de l'Appareil Circulatoire (Coeur et Vaisseaux). Two volumes comprising Section X of the *Nouveau Traité de Médecine* edited by Roger, Widal, Teissier and Garnier. Masson et Cie, Paris, 1933. Tome I, 135 fr. Tome II, 115 fr.

These two volumes comprise one of the most recent French publications on cardiovascular disease.

Volume 1, 991 pages, is voluminous, with extensive and rather unnecessary emphasis on details, often unimportant, of anatomy, physiology, phonocardiography, electrocardiography and arrhythmias, and pharmacology. In contrast to the excessive length of some of the chapters, that on the x-ray is much too brief although it is good so far as it goes. The chapter on cardiac insufficiency is good and contains some excellent illustrations. The chapter on angina pectoris is rather long because of the inclusion of the discussion of coronary thrombosis which is taken up in more satisfactory detail in the second volume. There is a fair review of functional tests and a fairly good discussion of etiologic and symptomatic treatment in heart conditions. A good many of the electrocardiograms that are scattered through the book are mediocre. The chapters in detail are as follows: 1. Anatomy and Physiology of the Heart, 2. Methods of Examination of the Heart, including Clinical Methods, Roentgenological Methods, Study of the Heart Sounds, and Graphic Methods, 3, Arrhythmias, 4. Cardiac Insufficiency, 5. Angina Pectoris, 6, Functional Testing of the Heart, 7. Pharmaco-dynamic Study of Cardiac Medicaments, 8. General and Special Treatment of Various Syndromes. The writers are Lutembacher, Teissier and Prieur, Bordet, Giraud, Coste, and Dumas.

Volume 2, 780 pages, is much more satisfactory than the first. It is better arranged, has much more useful and important discussion, and is less verbose. There is a great deal of historical interest in the volume and most of the illustrations are well done and instructive. The detailed chapters take up pericarditis, acute and chronic, pericardial effusion, tumors of the pericardium, acute endocarditis, including rheumatic, malignant endocarditis, various valvular lesions, acute and chronic myocarditis, dilatation of the heart, atrophy, fatty infiltration, various degenerative changes, coronary disease, coronary thrombosis and myocardial infarction, cardiac aneurysm, congenital malformations, displacements of the heart, trauma, rupture of the heart, parasites and syphilis, tuberculosis, and tumors of the heart. The writers are Teissier, Duvois, Mouquin, Giraud, Durand, Lian, Prieur, Rouvière, Pichon, Béthoux, and Dévé. As in the first volume, but much less so, there is some inequality in the value and fullness of the writings dependent on the fact that there are several different authors.

As a whole this section of the Nouveau Traité de Médecine can be recommended, as a work of reference rather than as a textbook.

Clinical Aspects of the Electrocardiogram. By HAROLD E. B. PARDEE, M.D. Third edition. Paul B. Hoeber. Price $5.50.

This is the third and revised edition of a treatise that has become authoritative in the field of electrocardiography. The book is not long, but yet complete. It covers the elements both practical and theoretical of the electrocardiographic apparatus, how it is constructed and how the tracings are taken. It discusses the method of diagnosing all the common irregularities and the clinical interpretation of the changes in the electrical complexes. The recent work on the ventricular complex in relation to myocardial disease and especially coronary

artery disease is taken up in detail. This phase of the subject has now become of extreme diagnostic importance and is one in which the author has done pioneer original work. This is probably the best book on clinical electrocardiography published in this country.

Human Values in Psychological Medicine. By C. P. BLACKER. Oxford University Press; London: Humphrey Milford, 1933. vii + 179 pages. Price $2.50.

Dr. Blacker, who is attached to the Department of Psychological Medicine of Guy's Hospital, London, reports, in general, the results of five years' experience in an out-patient clinic working with psychoneurotic patients. In addition, he has expanded these experiences into a book largely philosophical in character and Freudian in approach. He states in the preface, however, that he is not qualified to practise psychoanalysis in the strict sense. The book has considerable value as a report on the difficulties of practising psychiatry in out-patient departments, but otherwise consists of many pages of reflections by the author which do not have any practical bearing. The author appears to feel that the subject is enormous, which is correct, and he finds it difficult to put his ideas into simple language which would help to clarify his problem.

Modern Alchemy. By WILLIAM ALBERT NOYES and W. ALBERT NOYES, JR. Charles C. Thomas, Publisher, Wisconsin. 1932. Pp. 207. Price $3.00.

This embodies a short and readable account of modern chemistry and physical chemistry, presented in semi-popular form. In such a small compass, of course, no great detail can be given to any one phase, but for the scientifically-minded person who wishes to get a general smattering of recent work in the field of chemistry this will prove very serviceable.

The contents include an introductory chapter on the methods of science, consideration of atomic structure, an entertaining discussion of radio-activity, a fairly detailed presentation of the theoretical aspects of valence, accounts of new elements, and a very brief sketch of medical chemistry, including immunity and vitamins.

Chapters In American Obstetrics. By HERBERT THOMS, M.D. Charles C. Thomas, Springfield, Ill., and Baltimore, Md., 1933. Price $2.00.

In seven short chapters Dr. Thoms gives us an interesting outline of early American obstetrics. He reviews the work of Bard, who published the first textbook on obstetrics in America, the work of Stearns, who wrote on the use of ergot in parturition, and the work of Dewees. He speaks of Holmes' paper on "The Contagiousness of Puerperal Fever," Wright's work on cephalic version, and the volume ends with an account of Walter Channing, who was one of the earliest professors of obstetrics in the Harvard Medical School. One of Channing's earliest contributions was entitled "A Treatise on Etherization in Childbirth"; another was his "Notes on Anhaemia in Its Connection with the Puerperal State," in which nearly one hundred years ago he brought up the question of transfusion in the treatment of anemia in pregnancy.

The book is illustrated with reproductions of portraits of the early physicians. Following each sketch is a short bibliography, and the book ends with an excellent index.

An historical volume should be without errors in references, and it is regrettable that the reviewer found a few mistakes which it is to be hoped will be corrected in future editions.

Operative Surgery. Volume VII. By WARREN S. BICKHAM and CALVIN M. SMYTH, JR. W. B. Saunders, Co., Philadelphia. 1933. Price $10.00.

With this volume Smyth brings up to date the excellent system of operative surgery that was presented by Bickham in 1924. An index to the entire seven volumes is included. It is an almost impossible task to include in one book all the valuable additions to surgical knowledge made in the past decade, and no selections could please everyone. The attempt to cover the field has led to such brief outlining in some cases as to be of so little value that certain sections, especially those on general considerations, might profitably be admitted to allow fuller discussion of the operative procedures. There is a little duplication of work covered in the original volumes. On the other hand, some new yet tested operations are not mentioned. For instance, in consideration of esophageal diverticula he includes neither Lahey's two-stage operation nor the method of Shallow, Jackson and Clerf using the esophagoscope as a guide. The sections on anesthesia and on the use of fascia lata are especially well covered. There is a generous use of excellent illustrations. As a whole the volume covers the surgical advances of the past ten years remarkably well and every owner of the original work will wish to add it to his set.

Procedures in Tuberculosis Control for the Dispensary, Home and Sanatorium. By BENJAMIN GOLDBERG, M.D. Published by F. A. Davis Co., Philadelphia, Pa. Price $4.00.

This is a volume of some 375 pages divided into three sections and 43 chapters with a bibliography and index along with some 50 illustrations. The title "Procedures in Tuberculosis Control" might well be enlarged to "Procedures in Tuberculosis Control in Chicago" because 90% of the subject matter is based upon the present system of combating this disease as carried on under Dr. Goldberg's admirable direction in Chicago. Despite the fact that his city is known as gang-ridden and

corrupt, so far as tuberculosis is concerned many of the methods which have been in use in Chicago might well be copied in every city in this country. In Chicago, for instance, the method of raising money to combat tuberculosis is an admirable one which works no injustice on any particular group and yet provides an amazing sum for health purposes. Again there is a law which is enforced that no child of 16 years or under is allowed to remain in a family where there is an adult open case of tuberculosis. I doubt if there is another city in the country or perhaps in the world where such a radical law as this is actually enforced. In Boston, for instance, tuberculosis is classified along with scarlet fever, diphtheria, smallpox, etc., as a disease dangerous to public health. According to the law in Boston, a case of tuberculosis which the Health Authorities consider a menace to others can be treated exactly as a case of scarlet fever or smallpox would be treated. Despite this perfectly definite and plain law, however, attempts to enforce it have invariably failed.

Dr. Goldberg pays his compliments to the vast majority of medical schools in this country in the striking neglect they pay to the subject of tuberculosis. In Chicago, and I should say in Chicago, alone, there is the closest sort of coöperation between the work in tuberculosis carried on by the official agencies of the city and the various University Medical Schools and Hospitals. Such work, for instance, in Boston so far as the Harvard Medical School is concerned is conspicuous by its absence. The medical school authorities do not seem to realize that although tuberculosis as a cause of death in this country has dropped from first to sixth or seventh place, in the years from 20-40 the most productive and valuable years of a person's life, it still ranks number one in mortality. It would be a blessing if our medical school authorities could be acquainted with this fact so that less pure science and laboratory procedures were taught our medical students, and more practical information on such a disease as tuberculosis were given.

Dr. Goldberg's book cannot be reviewed in detail as this would be far too lengthy a procedure. The author has his own individual and peculiar ideas about tuberculosis, which is quite to be expected in a man of such vigorous and aggressive mentality. I consider this a welcome addition to the book although one does not always agree. The statement, for instance, that diet in Dr. Goldberg's opinion is the most important factor in the high mortality in Chicago of females from the years of 10-25 would not be agreed with by the vast majority of students and investigators in this field. This feeling on Dr. Goldberg's part that diet is of fundamental importance in the treatment of tuberculosis is emphasized later in the book in the chapters on this subject, to which he gives what I would consider undue attention and overmuch space. On the other hand, he does not give enough attention to the question of children and their care in preventoria or to the after-care of the consumptive after leaving the sanatorium, nor does one see enough space devoted to occupations for the tuberculous after leaving the sanatorium which is a most important and at present a neglected field. The chapter on surgery is excellent.

The book is a difficult one to read at one sitting, but is replete with information and up-to-date statistics on the economic and administrative side of tuberculosis and will be a most welcome addition to any library. It can be recommended highly.

The Principles and Practice of Obstetrics. By Joseph B. De Lee, A.M., M.D. Chicago. Philadelphia and London. W. B. Saunders Co. 1933. Sixth Edition. Price $12.00.

Dr. De Lee's textbook of Obstetrics is a standard work so well known as to require no introduction to the medical public. Previous editions of it have been favorably reviewed in the *Journal.* This sixth edition, thoroughly revised, has 1221 illustrations on 923 figures, of which 265 are in colors. There have been few changes in the chapters devoted to the practical application of obstetric principles. The greater part of the new material has been added under such topics as Local Anesthesia, the Newer Narcotics, the Aschheim-Zondek test, the Treatment of Eclampsia and Contracted Pelvis, and the subjects of Diabetes, Heart Disease, Syphilis, and Tuberculosis. The author has devoted a great deal of time and effort to references to the literature, which have been much augmented in numbers and diversity. In the revision of the chapter on Embryology and Physiology of the Fetus, he was assisted by Dr. George W. Bartelmez, Professor of Anatomy in the University of Chicago. This chapter is an exceedingly valuable and succinct statement of our present knowledge on these subjects. There has been added a chronological appendix giving an excellent brief summary of the history of Obstetrics. The volume now extends to 1129 pages, with an excellent cross-reference index of 34 pages.

Ten Years of Obstetrics and Gynecology in Private Practice. By John L. Rothrock, A.B., M.D., F.A.C.S. Paul B. Hoeber, Inc., New York. 1933. Price $3.00.

This book is an account of Dr. Rothrock's private work in obstetrics and gynecology. It is an interesting review showing the various types of cases and complications that arise in a private practice.

The reviewer cannot agree with the treatment which was used in many of the obstetrical cases. The prenatal care that was given would seem to have been inadequate, for 10 cases developed eclampsia while under Dr. Rothrock's personal care. Although this is not a large number out of

the total number of cases, 1750, it is much larger than should be allowed to occur if the cases are carefully watched.

A case that he reports shows his lack of appreciation of the seriousness of the situation. A patient entered the hospital with a blood pressure of 240 systolic, 160 diastolic, with hyaline and granular casts in the urine. Dr. Rothrock made a diagnosis of chronic nephritis and did a venesection, withdrawing 500 cc. of blood. Although the patient had an albuminuric retinitis, she was allowed to go on in her pregnancy five days without any attempt to empty the uterus. On the fifth day she had a cerebral hemorrhage and died within an hour.

His technique in a classical Caesarean varies much from the usual technique, and has nothing in its favor. He recommends the extraperitoneal Caesarean section, which unquestionably is much harder to perform and has no advantages over the low cervical.

Some of the cases that he reports lack sufficient detail to judge whether proper treatment was given.

The book is an honest report of the work that the author has done, but the management of many cases is not that of the best obstetrical thought of the present day, and should not be followed.

Office Surgery. By FENWICK BEEKMAN. J. B. Lippincott Co. 1932. Price $5.00.

The scope of this work is more comprehensive than its title suggests. It is written for the general practitioner, not for the surgeon. The relatively less serious conditions, which the practitioner may properly operate upon in his office, are considered. More than this the practitioner is instructed in the diagnosis of more serious conditions so that he may make a proper and intelligent disposition of the cases. He is also taught the proper initial treatment of grave surgical emergencies, prior to their transportation to a hospital for the services of the trained surgeon.

The author uses the term dicondylar instead of diacondylar for transverse or oblique fractures through the condyles of the humerus, instead of using the term as a synonym for intercondylar. We do not think in the consideration of elbow fractures that the author sufficiently stresses the importance of testing for the integrity of circulation and nerves prior to reduction. On page 163 he states "when there is a great deal of initial swelling, the arm should be temporarily placed in a posterior moulded splint with the elbow flexed to as acute an angle as is possible without it interfering with the circulation. When there is so much swelling that the elbow cannot be flexed to a position of ninety degrees, the patient should be placed in bed and the arm suspended from above with adhesive straps attached to the forearm". The author should state that when the radial pulse is absent, this form of expectant treatment should not be undertaken. A surgeon should be called in consultation at once so that an immediate fasciotomy and reduction may be performed to restore the circulation and avert Volkmann's contracture. We believe this is a serious omission. The reviewer has not chanced upon this omission. He has gone through the work with much pleasure and admiration. It is very readable. The diction is clear and terse. There are three hundred and eighty-seven pages. The ninety-four illustrations are well chosen. An excellent double-column index of thirteen pages greatly enhances its value as a reference book. The teaching is thoroughly sound and practical. The work should be ready at hand in the office of every general practitioner.

Intracranial Tumors. By PERCIVAL BAILEY. Springfield, Ill., and Baltimore, Md. Charles C. Thomas, 1933. xxii + 475 pages. Price $6.00.

This book consists of a series of clinical lectures apparently given to third or fourth-year medical students, which lectures have been expanded in order to form a book. The method of presentation is that commonly used in clinics; patients' histories are abstracted, the patient shown and the case discussed. The chief weakness of this form of writing is, of course, the absence of the patient; no pictures or pathological sections can ever make up for direct contact between student, physician and clinical material.

The book, however, presents a new point of view and the author deserves great credit for being the first to write a book on tumors of the brain based on pathological and etiological considerations. Professor Bailey's well-known previous volumes, with Harvey Cushing, "A Classification of the Tumors of the Glioma Group on a Histogenetic Basis with a Correlated Study of Prognosis" and "Tumors Arising from the Blood-Vessels of the Brain," have been extended to include in this publication all of the various types of brain tumor. As he rightfully points out in the preface, we have now reached a point in caring for these unfortunate patients where it is no longer considered sufficient to make a diagnosis of tumor of the brain; we now attempt to make not only the diagnosis of the presence of tumor but its location and particularly its nature. The exact nature of these tumors is strongly brought out by Bailey, and he finds that if we know the life history of a tumor, we are in a better position to suggest its probable location and method of removal.

One finds chapters, therefore, on the acoustic neuromas, hypophysial adenomas, meningiomas, astrocytomas, pinealomas, etc. Perhaps the most satisfactory chapters are on two types of tumors especially studied by Bailey in the past, those on the vascular system and the medulloblastomas. There is an excellent introduction of the physiology of the cerebral contents, a chapter on general

diagnosis, and one on differential diagnosis. The latter section is not one of the best in the book, for the author, primarily interested in neurosurgery, does not seem to be entirely familiar with many of the problems of the structural and functional neurologist. A final, short section, deals with surgical and roentgenological care.

The defects of this book are obvious. The style of expanded clinical lectures, definitely French in type, leaves much to be desired. The book, moreover, is written in a slangy, hospital English not consistent with a permanent scientific addition to our knowledge. The illustrations, which are line drawings instead of the usual half-tones, fail to be an aid to the text in about fifty per cent of the cases, particularly those attempting to show microscopic pathology.

The reviewer feels, however, in spite of the smaller defects noted above, that this is an outstanding book; the author's wide experience is clearly shown on every page and his method of approaching the subject of brain tumors, based on actual pathology, is admirable.

Practical Obstetrics for Students and Practitioners. By P. Brooke Bland, M.D., assisted by Thaddeus L. Montgomery, M.D. Philadelphia. F. A. Davis Company, 1932. Price $8.00.

This concise textbook of Obstetrics for students and practitioners is designed to be intermediate between the large standard work and the small manual. It is intended to furnish the practitioner with a dependable guide and the specialist with an exposition of the authors' personal views on current obstetric problems. The work follows the general plan of the standard textbook and is admirably illustrated with 516 engravings including 21 colored plates. Personal opinions of the authors are found chiefly in the chapters on Obstetric Physiology, Pregnancy Toxemia, and Puerperal Infection. It is to be noted that in the resuscitation of asphyxiated infants, the valuable method of mouth-to-mouth insufflation, so commonly omitted in modern textbooks, is apparently not mentioned. At the close of the book there is a valuable section of referred readings classified under 26 topical headings.

Essentials of Pediatric Nursing. By Ruth Alice Perkins, R.N., B.S. Second Edition. Revised and Enlarged. Published by F. A. Davis Co., Philadelphia.

This book will be of especial interest to nurses and those interested in problems of pediatric teaching. The author has recognized and presented the most essential facts for the education of nurses in this particular field. A foreword by Dr. Joseph Brennemann and an introduction by the author properly call attention to the nurse's singular opportunity in the care of infants and children. As is recognized, more depends upon the nurse's personality, powers of observation, and general efficiency than in many other fields. Quite properly, emphasis is placed upon the normal child, the problems of diet, and the psychology of childhood. A general résumé of medical conditions is given. The book contains questions suitable for teaching purposes after each chapter, valuable tables, valuable information concerning diets, and an adequate bibliography. Although throughout the text reference is made to private nursing, it seems to the reviewer that more emphasis on this phase could have been given. This book is well arranged and very satisfactorily edited. It is highly recommended to nurses and physicians interested in pediatric nursing.

Varicose Veins and Haemorrhoids and Their Treatment. By V. Meisen, M.D., with a preface by Aug. Krogh, Ph.D. 25 figures and 8 colored plates. Published by Levin & Munksgaard and Oxford University Press.

Any surgeon who is treating varicose veins, whether an occasional case or many cases, should not miss reading Dr. Meisen's article. His work is particularly important because of the very careful anatomical and physiological presentation. The reviewer has seen no other article which from diagrams and printed matter so intelligently presents the subject. Dr. Meisen's treatment varies a little from that in common use in Boston, but is perfectly correct.

The reviewer also agrees with Dr. Meisen that the injection treatment of hemorrhoids is a very important method of treatment. Here again his anatomical description is valuable and his treatment with the Bier suction-cup is worth reading about.

Études Neurologiques. By Georges Guillain. M.D. Fifth Series. Masson et Cie, Paris, 1933. VI + 462 Pages. Price 80 fr.

This volume, the fifth of a series begun by Dr. Guillain, neurologist at the Salpêtrière, Paris, contains reprints of his contributions for the last few years. The previous volume, issued in 1930, was reviewed in the *New England Journal of Medicine*, March 12, 1931. This book, somewhat larger than its predecessor, does not vary in type from it. There are nine papers on brain tumors, seven more on other pathological studies of the cerebrum, and about an equal number on the spinal cord and peripheral nerves. All of them are based upon the sound principles of presenting clinical pathological studies of the unusual manifestations of diseases of the nervous system.

The book is splendidly printed and well illustrated, although bound only in paper, as is the custom with volumes published in France. It closes with an appreciation of Charles Foix, a former associate of Dr. Guillain.

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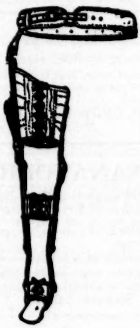

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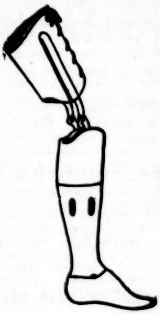

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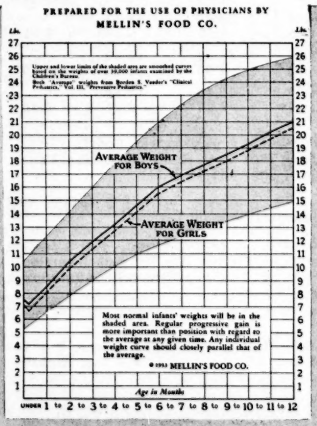
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